

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

**ANALYSIS OF PRIVATIZATION OF THE
JACKSONVILLE MILITARY COMPLEX'S
POTABLE WATER DISTRIBUTION SYSTEMS**

by

Deborah P. Cox

December 1996

Principal Advisor:

James Fremgen

Approved for public release; distribution is unlimited.

DTIC QUALITY INSPECTED 3

19970430 047

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY (<i>Leave blank</i>)			2. REPORT DATE December 1996	3. REPORT TYPE AND DATES COVERED Master's Thesis
4. TITLE AND SUBTITLE ANALYSIS OF PRIVATIZATION OF THE JACKSONVILLE MILITARY COMPLEX'S POTABLE WATER DISTRIBUTION SYSTEMS			5. FUNDING NUMBERS	
6. AUTHOR(S) Deborah P. Cox				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (<i>maximum 200 words</i>) Privatization of Department of Defense utility systems has become a central issue. It is seen as a way to relieve the Services of their current burden of huge maintenance and repair backlogs for aging systems. This thesis performs an economic analysis to determine whether it is economically feasible to privatize the Jacksonville Military Complex's potable water distribution systems. To address this issue, current legislation affecting utilities privatization was studied. Interviews were conducted with representatives of the Army, Navy, and Air Force regarding their current utilities privatization efforts. A case study of NAVWEPSA Earle was used to provide the framework in which the Jacksonville decision should be made. Data was gathered from NAS Jacksonville, NAS Cecil Field, and NAVSTA Mayport to calculate their annual water consumptions and the current plant value of their water systems. The systems' current plant value was obtained from NAVFAC's P-164 and adjusted for accumulated depreciation to provide the net current cost of the systems. These figures were used to derive the net present value of both the status quo scenario and the privatization scenario. Based upon the net present value calculations, privatization of the systems is recommended.				
14. SUBJECT TERMS Privatization, Life-Cycle Cost Analysis, Potable Water Distribution Systems.				15. NUMBER OF PAGES : 91
				16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

Approved for public release; distribution is unlimited.

**ANALYSIS OF PRIVATIZATION OF THE JACKSONVILLE MILITARY
COMPLEX'S POTABLE WATER DISTRIBUTION SYSTEMS**

Deborah P. Cox
Lieutenant, Civil Engineer Corps, United States Navy
B.S., United States Naval Academy, 1990

Submitted in partial fulfillment
of the requirements for the degree of

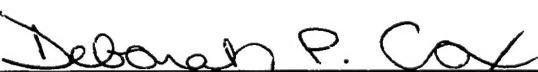
MASTER OF SCIENCE IN MANAGEMENT

from the

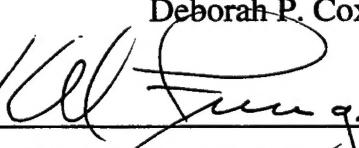
NAVAL POSTGRADUATE SCHOOL

December 1996

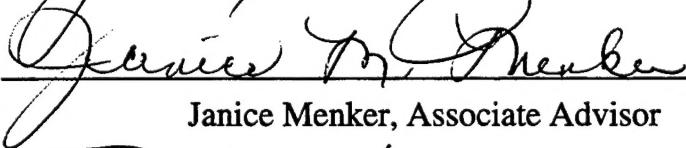
Author:


Deborah P. Cox

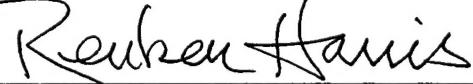
Approved by:


James Fremgen

James Fremgen, Principal Advisor


Janice M. Menker

Janice M. Menker, Associate Advisor


Reuben Harris

Reuben Harris, Chairman
Department of Systems Management

ABSTRACT

Privatization of Department of Defense utility systems has become a central issue. It is seen as a way to relieve the Services of their current burden of huge maintenance and repair backlogs for aging systems. This thesis performs an economic analysis to determine whether it is economically feasible to privatize the Jacksonville Military Complex's potable water distribution systems. To address this issue, current legislation affecting utilities privatization was studied. Interviews were conducted with representatives of the Army, Navy, and Air Force regarding their current utilities privatization efforts. A case study of NAVWEPSTA Earle was used to provide the framework in which the Jacksonville decision should be made. Data was gathered from NAS Jacksonville, NAS Cecil Field, and NAVSTA Mayport to calculate their annual water consumptions and the current plant value of their water systems. The systems' current plant value was obtained from NAVFAC's P-164 and adjusted for accumulated depreciation to provide the net current cost of the systems. These figures were used to derive the net present value of both the status quo scenario and the privatization scenario. Based upon the net present value calculations, privatization of the systems is recommended.

TABLE OF CONTENTS

I. INTRODUCTION	1
A. GENERAL BACKGROUND	1
B. RESEARCH QUESTIONS	4
C. LITERATURE REVIEW AND METHODOLOGY	4
D. SCOPE AND LIMITATIONS OF THE THESIS	5
II. PUBLIC SECTOR INEFFICIENCIES - A GENERAL DISCUSSION OF PRIVATIZATION	7
A. THE ROLE OF THE PUBLIC SECTOR	7
B. POLITICAL INFLUENCE IN PUBLIC SECTOR RESOURCE ALLOCATION DECISIONS	9
1. No Economic Bottom Line	9
2. Nature of Federal Employee Incentives	10
C. PUBLIC SECTOR PRODUCTION INEFFICIENCY	11
1. Costs	12
2. Decision Making	13
D. EVENTS FAVORING PRIVATIZATION	15
1. Decrease of the Federal Discretionary Budget	15
2. Single World Economy	17

III. PRIVATIZING DOD UTILITY SYSTEMS: IMPEDIMENTS TO	19
A. IMPLEMENTATION CONCERNS	20
1. No Single Model	21
a. Britain's Methods	21
b. DoD's Utility System Models	22
2. Interested Party	24
3. Legal Liability	24
4. Lack of Control/Enforcement Mechanisms	25
B. CONGRESSIONAL LEGISLATION	26
1. CIAC Tax	26
2. Authorization Level	27
3. Fair Market Value	33
IV. PRIVATIZATION CASE STUDY	35
A. NAVWEPSA EARLE, NEW JERSEY	36
B. ALTERNATIVE 1 - STATUS QUO	37
1. Annual Water Consumption	39
2. Operations & Maintenance Expenses	41
3. Unit Cost of Capital	41
4. Administrative and Overhead Expenses	44
5. Net Present Value Calculation for Alternative 1	44
C. ALTERNATIVE 2 - NJAWC's \$1.1 MILLION BID PRICE	44

1.	Facilities Credit	46
2.	Net Present Value Calculation for Alternative 2	46
D.	ALTERNATIVE 3 - GUERNSEY'S \$2 MILLION PRICE	47
E.	CONCLUSIONS AND RECOMMENDATIONS OF STUDY	48
F.	WHAT ACTUALLY TRANSPired	50

V. PRIVATIZATION ANALYSIS OF THE JACKSONVILLE MILITARY	
COMPLEX POTABLE WATER DISTRIBUTION SYSTEMS	53
A. SCENARIO 1 - STATUS QUO	54
1. Operations & Maintenance Expense	55
2. Administrative & Overhead Expense	56
3. Unit Cost of Capital	56
4. Net Present Value Calculation for Scenario 1	57
B. SCENARIO 2 - PRIVATIZATION	57
1. Annual Water Consumption	59
2. Annual Water Purchases	61
3. Facilities Credit Calculation	63
4. Net Present Value Calculation for Scenario 2	63
VI. CONCLUSIONS AND RECOMMENDATIONS	65
A. CONCLUSIONS	65

1.	Primary Research Question. Is It Economically Beneficial for DoD To Privatize the Potable Water Distribution Systems of the Jacksonville Military Complex?	65
2.	Subsidiary Question # 1. What are the Circumstances in the Public Sector That Give Rise to Privatization?	65
3.	Subsidiary Question #2. What are the Major Impediments to Privatization?	66
4.	Subsidiary Question #3. What Role Does Congress Play in Privatization?	66
5.	Subsidiary Question #4. What are the Costs/Benefits of Privatizing the Potable Water Distribution Systems for NAVWEPSTA Earle?	67
6.	Subsidiary Question #5. How Do the Costs of Outsourcing the Potable Water Distribution Systems for the Jacksonville Military Complex Compare To the Costs of Privatization?	68
B.	RECOMMENDATIONS	68
1.	Solicit Bids From Utilities to Determine the System's Fair Value	68
2.	Develop a New System to Record Plant Value	69
3.	Install Water Meters at Major Customer's Buildings	69
C.	AREA FOR FURTHER RESEARCH	70

APPENDIX 71

LIST OF REFERENCES 73

INITIAL DISTRIBUTION LIST 77

I. INTRODUCTION

The purpose of this thesis is to determine whether or not it is economically beneficial for the Government to privatize the potable water distribution systems of the Jacksonville Military Complex. For purposes of this thesis, the Jacksonville Military Complex includes Naval Air Station (NAS) Jacksonville, NAS Cecil Field, and Naval Station (NAVSTA) Mayport, all located in Northern Florida. A case study of Naval Weapons Station (NAVWEPPSTA) Earle, New Jersey is utilized to provide a framework in which to analyze the decision of whether or not to privatize the potable water distribution systems on these three Florida bases. NAVWEPPSTA Earle was chosen as it is one of the few Navy bases on which a privatization study of the potable water distribution system has been completed. Appropriate privatization legislation will be reviewed so that the reader is familiar with the Department of Defense's (DoD) current utilities privatization efforts. General background will be provided regarding the drivers of the current privatization movement.

A. GENERAL BACKGROUND

A simple definition of privatization is "...to transfer production of Government services to private firms (Fisher, 1996, p. 163)." An expanded definition and discussion of privatization is found in Chapters II and III. Privatization, the concept or decision, includes both political and economic criteria and currently requires Congressional approval. Economically, Congress will not approve a privatization proposal if an economic analysis does not support this decision. (Statement of Work Public Works Center Jacksonville, Florida: Cost of Service Study and Economic Analysis, June 11, 1996) The DoD is

analyzing its "core function" to determine those services that are "...not essential to the conduct of its inherent functions" and therefore are candidates for privatization (Whitta, 1996).

There are numerous methods available to achieve privatization and multiple degrees to which a service may be privatized, ranging from outsourcing (the Government contracts for the services) to full divestiture of the assets that the Government was utilizing to provide the good or service. (Stroup, 1994, p. 558)

	Public Financing	Private Financing
Public Production	1	2
Private Production	4	3

Figure 1. Categories of Service

Figure 1. illustrates the four fundamental ways services may be categorized, depending upon the source of production and financing. A service is considered to be publicly produced if it is provided by the Government. A service is considered to be financed publicly if it receives its revenue from the Government, i.e. through taxation or borrowing. Services typically thought of as Government functions, such as national defense, lie in quadrant 1. (Stiglitz, 1988, pp. 131, 146)

Some of the goods and services found in quadrant 1 are considered to be public goods, but not all publicly funded and produced goods and services are public goods in the

economic sense. In the economic sense, public goods are defined to exist when the market fails to supply goods in sufficient quantity to meet demand. Public goods have two critical properties. First it is not feasible to exclude any individual from enjoying the good. (Stiglitz, 1988, pp. 119-120) An example of this is clean air, for which it would be infeasible to bill (Nutt & Backoff, 1992, p. 2). Everyone enjoys the benefits of clean air, regardless of whether or not they are willing to pay for the good. Hence, the free rider problem exists. A second critical property of a public good is that it is not desirable to exclude any individual. Consumption is nonrival and cost is not increased for an additional individual to enjoy the benefits. An example of this is navigational aids, such as buoys or a lighthouse. There is no cost for an additional sailor to use one of these aids. (Stiglitz, 1988, pp. 74-75, 119-120)

The notion of public goods is important when considering implementing privatization schemes.

Quadrant 2 describes those services which are publicly produced, but paid for privately. The U. S. Postal Service is an example of such a service. It is constitutionally mandated and employees are federal employees. However, individuals pay for the mail delivery services they desire on a fee-for-service basis. (Stiglitz, 1988, p. 179) Quadrant 3 illustrates those goods typically considered to be private. A pentium computer is an example of a private good. It is produced by a private company such as International Business Machine (IBM) or Microsoft and it is financed through consumer purchases. The decision maker knows his preferences and the value the item has to him. (Stiglitz, 1988, pp. 146-147)

The Government is still involved in quadrant 3 goods and services because it provides industry regulatory guidance and taxes the transactions (Stiglitz, 1988, p. 2). In quadrant 4

goods are produced privately, but financed publicly. For example, the Government purchases items, ranging from weapons systems to office equipment, from the private sector.

The goal of privatization is to move services currently performed in quadrant 1 into the other quadrants (Stiglitz, 1988, p. 26). The degree of privatization will shift from quadrant 2 through 4. This thesis will consider shifting services into each of these three quadrants. Case studies of the Government's potable water distribution systems on four military bases will be analyzed to discover in which quadrant the public interest is best served.

B. RESEARCH QUESTIONS

This thesis analyzes the primary question - Is it economically beneficial for DoD to privatize the potable water distribution systems of the Jacksonville Military Complex? To answer this primary question, five subsidiary questions will be studied:

1. What are the circumstances in the public sector that give rise to privatization?
2. What are the major impediments to privatization?
3. What role does Congress play in privatization?
4. What are the costs/benefits of privatizing the potable water distribution systems for Naval Weapons Station (NAVWEPESTA) Earle?
5. How do the costs of outsourcing the potable water distribution systems for the Jacksonville Military Complex compare to the costs of privatization?

C. LITERATURE REVIEW AND METHODOLOGY

An extensive literature review of the background of the current privatization movement was performed. Chapter II focuses on the inefficiencies of the public sector which make privatization desirable. Chapter III highlights DoD's current privatization policies,

initiatives, and the impediments to these efforts. Chapter IV provides a synopsis of a privatization study performed by a private contractor, C. H. Guernsey & Company, on the potable water distribution system of NAVWEPSTA Earle, New Jersey. This case study provides a framework of the types of costs and benefits associated with privatizing a potable water distribution system. This framework of types of costs is applied to the potable water distribution systems of the Jacksonville Military Complex to determine whether or not privatization is in the best interest of the Government. In choosing two different sites for this thesis, a diverse base will amplify and illustrate some of the driving factors of the privatization decision. Chapter VI offers conclusions, recommendations, and areas for further study.

D. SCOPE AND LIMITATIONS OF THE THESIS

The main thrust of the thesis study is to analyze whether or not it is economically beneficial for the Navy to privatize the potable water distribution systems for the Jacksonville Military Complex. Privatization is presented as an alternative to the rising costs of maintaining the military's infrastructure. However, there are numerous unknowns in the privatization forecasting model, including specifics to each geographic location. The major impediments to privatization, including Congressional involvement in this process, are reviewed to provide the guidelines in which the privatization decision will be made. As utilities privatization is a relatively new concept to DoD, little historical data exists concerning the long run economic costs or benefits. The Navy, Army, and Air Force are

currently conducting studies into the feasibility of numerous privatization projects ranging from potable water distribution systems to Child Development Centers and Family Housing.

II. PUBLIC SECTOR INEFFICIENCIES - A GENERAL DISCUSSION OF PRIVATIZATION

Although the concept of privatization can be traced back to the end of World War I (Cole, 1988, p. 11), it did not gain its current momentum until the 1980s under Prime Minister Margaret Thatcher in England and President Ronald Reagan in the United States (Stroup, 1994, p. 558). “ ‘The role of Government should not include performing services and activities that can effectively be carried out by the private sector,’ said President Reagan in 1983 (Fitzgerald, 1988, p. 224).” The privatization movement is forcing Government to analyze its roles and methods for fulfilling them. The goal of privatization is to place heavier reliance upon the private sector. “A Government able to delegate the implementation of its policy goals finds itself with fewer administrative chores, and more time and resources to devote to its primary task - making sound and just laws in response to the popular will (Fitzgerald, 1988, p. 299).”

A. THE ROLE OF THE PUBLIC SECTOR

"Government is a social contract between citizens (Savas, 1982, p. 1)." Its power is supplied by the willing consent of the governed. As stated in the Declaration of Independence, the original goal of the United States Government was to enable its citizens to enjoy life, liberty, and the pursuit of happiness. In order to provide these inalienable rights to its citizenry, the Government performs certain roles. As specified by one author, E. S. Savas, these roles include building the nation and integrating its parts, allocating the costs

and benefits of change and progress, correcting the major abuses of business, alleviating human problems, and improving the lot of the populace. (Savas, 1982, p. 2)

Currently, the Government performs numerous functions to achieve its mission. Economists view the primary mission to be "...to provide the legal framework within which all economic transactions occur (Stiglitz, 1988, p. 24)." In accomplishing that mission, the Government's functions may be divided into four categories and related to the matrix regarding public or private, financing or production, shown in Chapter I, Figure 1. The first category pertains to the production of goods and services, ranging from the quadrant 1 service, national defense, to the quadrant 2 service, the U.S. Postal Service. The second function concerns Government's influence on the private sector due to regulation and subsidization of private producers. This area includes regulating the mergers of large companies to prevent the creation of a monopoly, a quadrant 3 service, and providing farm subsidies, a quadrant 4 service. The third category deals with the redistribution of income and provision of social insurance to its citizens. An example of redistribution of income is welfare, a quadrant 1 service. Medicare, a quadrant 4 function, is an example of social insurance. The fourth area of Government responsibility is concerned with the purchase of goods and services as resources needed to conduct internal business, such as weapon systems procurement from private industry, a quadrant 4 function. (Stiglitz, 1988, p. 24)

B. POLITICAL INFLUENCE IN PUBLIC SECTOR RESOURCE ALLOCATION DECISIONS

The term public means “of the people (Nutt & Backoff, 1992, p. 25).” Most of the heads of public institutions are elected or, appointed by someone who is elected. These institution heads are held accountable either to the entire constituency of voters, if elected, or to a collection of elected officials, if appointed. “Unlike a private firm owner, a bureaucrat does not own property rights to future increases in the value of the agency or to its reputation after he leaves it...Thus, the bureaucrat has an incentive to make decisions that enlarge the agency’s size and output only during his tenure at the agency (Johnson, 1991, p. 289).” In contrast, a private firm’s board of directors represent the interests of the owners of the firm, who will realize both the full benefits of good decision making as well as the full costs of bad decisions made by the management. What determines whether or not a manager is judged to be a success in a private firm is “...how well you run the place (Blumenthal, 1979, p. 26).”

1. No Economic Bottom Line

In Government, there is no such economic measurement:

There is no acceptable yardstick to measure the value of most bureaucratic output...This...produces uncertainty and gives bureaucrats and legislators considerable flexibility in determining ‘social needs’...Bureaucrats are motivated by promotions, power, prestige, perks, influence, reputation...The unwritten but most important mission of the senior bureaucrat is to expand the agency. (Johnson, 1991, pp. 286-287)

These motivations arise because of the political market failures which reward public sector managers by noneconomic criteria such as “...the size of their agencies: the number of

employees and the dollar amount of their budget (Goodman, 1985, p. 116)," and their influence over decision making (Blumenthal, 1979, p. 24).

Another aspect of Government which differentiates it from the business sector is its rights of compulsion (Stiglitz, 1988, p. 9). Unlike institutions in the private sector, the Government may force citizens to pay taxes and abide by its rules and regulations, curtailing the benefits of competition in the supply of publicly provided goods and services (Stiglitz, 1988, p. 9). A private organization does not possess compulsion authority. Shareholders are interested in the company's growth and profitability. They invest of their own free will and may transfer their economic support to a competing interest at any time they wish. The economic market drives private enterprise, while the diverse views of politics drive the public sector. (Blumenthal, 1979, p. 28) "At the theoretical level the political market does have a measure of overall performance, which is equivalent to profits in the private sector. This measure is votes." (Johnson, 1991, p. 286) However, votes cannot be used as an incentive for bureaucrats. Civil service jobs are not linked to votes. Also, it is difficult to quantify an individual's contribution toward receipt of votes for those elected or appointed positions which depend upon votes. (Johnson, 1991, p. 286)

2. Nature of Federal Employee Incentives

"Many federal organizations are also monopolies, with few incentives to innovate or improve. Employees have virtual lifetime tenure, regardless of their performance. Success offers few rewards; failure, few penalties." (Gore, 1993, p. 3) People are encouraged to perform by incentives (Nutt & Backoff, 1992, pp. 48-49). However, Government has insulated employees from the power of economic incentives (Gore, 1993, p. 43). Many

Government decisions are made on political grounds, while private sector managers feel the incentive provided by profit margin and tend to base their decisions on economic factors, related to the market (Pririe, 1985, p. 13).

The source of bureaucratic problems lies not in the bureaucrats but in the nature of public goods and the incentives, controls, and institutions existing in the bureaucracy...Bureaucrats have the same weaknesses, strengths, abilities, and values as workers in private industry. (Johnson, 1991, p. 281)

"The problem is not lazy or incompetent people; it is red tape and regulation so suffocating that they stifle every ounce of creativity. Today's primary issue is how Government works (Gore, 1993, p. 2)."

It has been assumed that Government employees are individually inspired by their mission of public service as soundly as profit motivates the private sector (Pririe, 1985, p. 6). Thus, an illusion that the public sector is "different in kind" and entitled to a different standard of evaluation has been created (Pririe, 1985, p. 6). This different standard may still be applied to inherently Governmental functions, such as national defense. However, today's generally shared belief is that the Government should be held to the same standards as industry when performing similar, noninherent Governmental functions, such as potable water service. (Pririe, 1985, p. 7)

C. PUBLIC SECTOR PRODUCTION INEFFICIENCY

"In the name of controlling waste, we have created paralyzing inefficiency. It's time we found a way to get rid of waste and encourage efficiency (Gore, 1993, p. 3)." Due to the political influences and production inefficiency found in the public sector, arguments have

been made that "... 'Government should spend more time governing and less time providing, should either purchase services from the private sector or, simply, stop producing' (Fitzgerald, 1988, pp. 7-8)." Privatization of noncore functions will enable the Government to focus on governing. Many issues weigh into the privatization decision, ranging from economics to changing people's attitudes and from impact on mission to implementation concerns (Savas, 1987, p.289). Political and social externalities must also factor into the privatization decision for it to be successful. (Goodman, 1985, p. 34) The following sections will consider two areas of public sector production inefficiency, costs and decision making.

1. Costs

"Competition and profit incentives are far stronger efficiency tools than any bureaucratic management ploy, except perhaps the threat of death, that Government has ever devised (Fitzgerald, 1988, p. 18)." Studies have shown that whether a service is provided publicly or privately proves to be of secondary importance to whether or not it is delivered under competition (Goodman, 1985, p. 117).

Competitive bidding by profit-maximizing firms for a well-specified output guarantees that the product will be produced at the lowest cost. The absence of competition and profit incentives in the public sector is not likely to result in cost minimization. (Fisher, 1996, p. 165)

Study after study arrive at the same conclusion: public sector costs of production are much higher than those found in private industry (Pririe, 1985, p. 8). "It appears that market-induced pressures to keep costs down and profits up act as a better discipline on the private sector than does the desire for economy on the public sector (Pririe, 1985, p. 9)."

Costs are also higher in public organizations as a consequence of the public sector's monopoly, since it is more vulnerable to the pressures which increase costs, namely restrictive work practices. (Pririe, 1985, p.10) "The public sector shows an immunity to cost controls (Pririe, 1985, p. 15)." The Government may raise or lower its budget and, in turn, its revenue, with taxes (Pririe, 1985, p. 15). Public sector expenses consist of a variety of factors, some of which the Government can not control (Pririe, 1985, p. 16). "Groups which benefit from public operations form vociferous and effective lobby groups with high media visibility and the power to sap the will of an economy-minded administration (Pririe, 1985, p. 16)." Thus, it is difficult for Government to match the cost-cutting which private industry achieves (Pririe, 1985, p. 9).

Cost savings are to be reaped when a service is provided at the most efficient level (Goodman, 1985, pp. 116-117). Many Government services are duplicative (Gore, 1993, p. 94). The Education Department funded 230 programs, many of which overlapped, when the National Performance Review was conducted in 1993 (Gore, 1993, p. 100). This review recommended reduction of the number of programs and streamlining their procedures. Privatization of a service "...can take the service into the purely economic world and out of the political world (Pririe, 1985, p. 2)."

2. Decision Making

The Government is managed by the Executive, Legislative, and Judicial Branches of Government, a balance created in the Constitution. To accomplish a goal, interest groups and lobbyists must be rallied to the politician's side, get the backing of coalitions, and build

alliances through compromise on other issues (Goodman, 1985, pp. 31-34). No one has ultimate authority over decision making. (Levine, 1990, pp. 52-54)

There's nothing inherent in a bureaucrat that makes him less efficient. It's the way the system is structured...In the Government no one has the power to decide that this is the policy he wants to develop, these are the people who are going to develop it, this is how it's going to be decided, and these are the folks who are going to administer it. No one, not even the President, has that kind of power. (Blumenthal, 1979 pp. 28, 30)

As Michael Blumenthal discovered while he was Secretary of the Treasury, a large number of players is required to accomplish anything (Blumenthal, 1979, p. 30). As Blumenthal stated: "Nothing can be kept secret. Everyone feels he has a legitimate interest and must be in the loop. Thus, the difficulty of making decisions in the public sector is compounded (Blumenthal, 1979, p. 30)."

...(E)ach time you have an administrative decision to make, which increases efficiency or which starts a new policy, you have to ask yourself, is that decision more important than the decision ... on the budget? Is it worthwhile to get adverse publicity in the newspapers, or get into a fight with Congressman X, over that issue, or should I not keep my good will so that I can use my credit with those people on the big things? (Blumenthal, 1979, p. 26)

Consumers have some control over private organizations as they may decide whether to buy a company's products or to seek satisfaction elsewhere (Pririe, 1985, p. 11). Private goods and services are oriented toward consumer satisfaction (Pririe, 1985, p. 11). "Too many agencies have learned to overlook their customers. After all, most of Government's customers can't really take their business elsewhere (Gore, 1993, p. 44)." This lack of competition creates a situation in which the public sector tends to become producer-oriented (Pririe, 1985, p. 12). Aim shifts from the customer to the worker; the provision of jobs

becoming paramount. "It is sadly ironic that private businesses are more under the control of the general public than those businesses which are 'publicly owned' (Pririe, 1985, p. 12)."

Many federal organizations are also monopolies...customers are captive; they can't walk away from the air traffic control system or the Internal Revenue Service and sign up with a competitor. Worse, most federal monopolies receive their money without any direct input from their customers. Consequently, they try a lot harder to please Congressional appropriations subcommittees than the people they are meant to serve. Taxpayers pay more than they should and get poorer service. (Gore, 1993, p. 3)

The National Performance Review was conducted "...to make Government *work better* and *cost less* (Gore, 1993, p. I)." The policy of privatization can give consumers choice and input (Pririe, 1985, pp. 24-25). "It can leave capital spending and price decision free to be determined by straightforward economic logic, instead of by an anticipation of what the public might tolerate (Pririe, 1985, p. 25)."

D. EVENTS FAVORING PRIVATIZATION

Although privatization is not a new concept, it is a quiet revolution which has recently started to gain attention. "Philosophy borne of suspicion for big Government may underlie this revolution in America, but necessity is the mother of privatization (Fitzgerald, 1988, p. 20)." Two primary catalysts have spurred the current drive to privatize. They have created today's environment of change, which has fostered the rapid spread and acceptance of this movement.

1. Decrease of the Federal Discretionary Budget

A primary change agent supporting new ways of doing business is the decrease of the discretionary portion of the Federal budget. The Federal debt is rising because mandatory

spending for programs such as Medicare and Social Security is increasing. The discretionary portion of the budget can offset this growth in mandatory spending. Domestic discretionary spending as a share of gross domestic product (GDP) has decreased from 4.7 percent in 1980 to 3.5 percent in 1995. (Congressional Budget Office, 1996, p. 141) One of the consequences of the constraints placed on the discretionary portion of the Federal budget has been renewed effort to find efficiencies in Government. Questions are being asked such as, "Must we tolerate costly, inefficient bureaucracies unresponsive to our wishes, or can we better address social priorities by harnessing the power of the marketplace to deliver a wider range of options and solutions (Fitzgerald, 1988, p. 17)?" The public has become increasingly disillusioned with Government. (sic.) "Only 20 percent of Americans trust the federal Government to do the right thing most of the time-down from 76 percent 30 years ago (Gore, 1993, p. 1)." "Our Government is in trouble. It has lost its sense of mission; it has lost its ethic of public service; and, most importantly, it has lost the faith of the American people (Gore, 1993, p. 9)." In his book, When Government Goes Private, Fitzgerald asks:

Are the bureaucratic structures of Government constituted to tax us arbitrarily to finance whichever interest groups happen to exercise the most political influence, providing unlimited services on demand, or is the role of Government more properly to insure that only essential services are provided, with Government acting as the facilitator of delivery rather than as the provider? (Fitzgerald, 1988, p. 17)

This budget decrease has placed pressure on agencies to explore new avenues of doing business and to reassess their appropriate role and how they might best allocate their scarce resources. Today, public sector managers are searching for ways to ensure quality services are provided to the public in the most economic manner. The competition

associated with privatization has enabled public sector managers to achieve some of the savings needed. "It is in *service delivery* that competition yields results-because competition is the one force that gives public agencies no choice but to improve." (Gore, 1993, p. 55)

2. Single World Economy

Another pressure to privatize comes from the emerging single world economy (Linowes, 1988, p. 245). Advanced technology has virtually removed all barriers to world trade and has created a single world economy. "The most important force favoring a prominent future for privatization is the rapid pace with which a single world economy is developing and the intense competitive pressures thereby being created on each nation to rationalize its economic system." (Linowes, 1988, p. 245)

This intense world competition is forcing the private sector to become more efficient and effective or go out of business. If a product can be made cheaper in another nation, companies are moving their production facilities to that nation. If another company offers a similar (substitute) product at a cheaper price, consumers are buying the other product. The public sector is still, however, insulated from this world competition. Each country's Government still functions independently of others and does not reap the benefits of this heightened competition. Private industry has achieved savings through competition and the Government is following its example. Privatization is seen as a way to achieve this goal. (Gore, 1993, pp. 43-44)

III. IMPEDIMENTS TO PRIVATIZING DOD UTILITY SYSTEMS

Although privatization offers numerous benefits, it is not appropriate in all circumstances (GAO/GGD-92-11, 1991). "The Government should not contract out its responsibilities to serve the public interest or to exercise its sovereign powers (GAO/GGD-92-11, 1991)." "Inherent Government functions should never be privatized but always performed by federal Government personnel (Whitta, 1996)." The inherent Governmental functions include national defense, criminal investigations, tax collection, and regulation of industry (Fitzgerald, 1988, p. 225).

The privatization decision is situation-specific, requiring skill to anticipate stakeholders's reactions and choose a method of privatization which will make the plan acceptable to all parties (Pririe, 1985, p. 28). Numerous methods exist to achieve privatization, ranging from its purest form, selling off an entire Government enterprise into unregulated private ownership, to outsourcing or contracting-out to private industry for the provision of a service (Stroup, 1994, p. 558). Each situation must be individually appraised to determine the appropriate method of privatization, if any. The economic analysis must show privatization as a cost effective route for it to be the appropriate solution. (McCulla, November 22, 1996)

The basic framework for the U. S. Government performance is set forth in the Constitution. Government was designed to be for the people, not necessarily for efficiency or effectiveness. (Stiglitz, 1988, p. 59) It has socioeconomic, political and other objectives (Stiglitz, 1988, p. 80). Public goods, such as national defense, are an example of inherently

Governmental functions which should not be privatized (Stiglitz, 1988, p. 120). There are "...critical skills which must be maintained and strengthened within the DoD's workforce (Whitta, 1996)."

The Air Force's overall long-term goal is to get out of the business of owning, operating and maintaining base utilities where it makes good sense, both economically and in accordance with mission constraints. The Air Force will retain utilities where needed to maintain readiness capabilities, but where it makes sense the utilities can be transferred to the private sector. In return, the Air Force will purchase a utility service at a negotiated rate, receive a reliable and cost efficient service, and generate savings for modernization of core disciplines. (Vinger, 1996)

The Air Force may privatize its utility plants, but needs to retain ownership of some potable water, wastewater, gas, and electrical distribution systems to ensure it has the critical wartime skills needed to maintain such systems (Vinger, November 22, 1996). Air Force personnel need skills such as how to repair a broken water main line; when they go into combat they deploy to a military base near the area of conflict, and it is their responsibility to ensure utility service is provided for the base (Vinger, November 22, 1996). Below is a discussion of the two main categories of impediments to privatization of DoD utility systems.

A. IMPLEMENTATION CONCERNS

Privatization "... is not simply a question of 'selling off the state.' . . . It is a question of regarding each part of the state as an individual problem requiring appropriate treatment (Pririe, 1985, p. 27)."

1. No Single Model

Privatization is situation specific; there is no single model or formula (Pririe, 1985, p. 27). Recognition of the roles played by stakeholders, including interest groups, media, and political pressure groups, is vital to achieving a successful privatization (Pririe, 1985, p. 27). Provisions must be included to neutralize or outweigh the adverse effects of such stakeholders. Ideas must be presented in the correct manner (Goodman, 1985, p. 33). Government managers must be understanding of the problems of those displaced and design elements in the new policy to take care of them and recognize their interests. (Goodman, 1985, p. 34)

Judgement and skill are required to anticipate the various responses of stakeholders and apply appropriate measures to make the plan acceptable to all parties. The methods to be used vary. (Pririe, 1985, p. 29) "The process of privatization is not one which depends only on the will of a Government. There must also be considerable creativity in policy innovation (Pririe, 1985, pp. 28-29)." Although there is no single model to follow to achieve successful privatization, Britain employed six main techniques which were successful in privatizing numerous state assets (Goodman, 1985, pp. 25-34).

a. *Britain's Methods*

Prime Minister Margaret Thatcher's Government began its privatization movement by first making changes on a small scale, gradually presented one after another, so that no one was particularly zealous about them (Goodman, 1985, p. 26). Second, think tanks were utilized to circulate similar ideas prior to their being announced by the Government (Goodman, 1985, p. 29). This procedure gave the public time to become

accustomed to a concept. The fact that experts who comprise the think tanks, not the Government, developed the new idea built the public's confidence and hence reduced the political risk associated with privatizing. The third technique was to effectively use the media to present the Government's perspective in a way which generated public support (Goodman, 1985, p. 30). Fourth, people were given their first taste of the market economy and its freedom of choice (Goodman, 1985, pp. 27-28). They discovered they had more flexibility and liked that. The last two techniques employed were to package ideas in a different and acceptable way and to build coalitions in support of these ideas. These six techniques are responsible for the tremendous success the Thatcher Government experienced with privatization of state operations including British Rail hotels; Sealink, the English Channel ferry services; the National Coal Board; British Sugar; The University of Buckingham; and British Leyland's Jaguar division. (Goodman, 1985, pp. 26-76)

b. *DoD's Utility System Models*

There are fundamental differences between privatization in the United States and Britain. For the purposes of this thesis, only brief mention will be given to them. Britain was concerned primarily with selling off assets, while privatization in America is primarily concerned with dismantling Government services (Goodman, 1985, p. 41). The Constitution structured the American system for potential gridlock. It created the three equal branches of Government and the system in which the President's political party does not necessarily have a majority in Congress and Congress has authority to override a Presidential veto by a two-thirds vote. With this background, privatization of DoD's utility systems will now be studied.

The Department of the Army's (DoA) policy on privatization "...encourages the ownership and full services of local municipal, private, regional or cooperative utility companies when such use is cost effective (Army Technical Note No. 420-41-3, p. A-2.)" The Military Services each have their own, different goals in regards to the privatization of utilities systems. The Army's goal is to privatize at least 75 percent of its utility systems by the year 2000 (Eng, 1996, p. 4). The Air Force, as stated above, wants to "...get out of the business of owning, operating and maintaining base utilities where it makes good sense, both economically and in accordance with mission constraints (Vinger, 1996)." To date, the Navy does not have an official policy stating its utility privatization goals (Ashley, November 22, 1996).

The Navy is currently performing privatization studies at four pilot sites, NAS Whidbey Island, Washington; Construction Battalion Center, Port Hueneme, California; Naval Station Pascagoula, Mississippi; and NAS Jacksonville, Florida to develop its policy on the privatization of utility systems (Ashley, November 22, 1996). The Office of Management and Budget Circular A-76 does not apply to these studies. The Jacksonville area, specifically, completed an A-76 study in the late 1980s when the area outsourced its Public Works functions (Ashley, December 12, 1996). In March, 1997 the points of contact at each of these pilot sites will meet with Naval Facilities Engineering Command (NAVFAC) personnel to identify the lessons learned from these sites. Based upon these lessons, the Navy will draft recommendations to the Director of Shore Installation Management Division, Chief of Naval Operations, to set the policy. (Ashley, November 22, 1996)

The Air Force has also chosen four pilot sites to study the feasibility of privatizing utility systems (Vinger, November 22, 1996). These sites are Langley Air Force Base, Virginia; Scott Air Force Base, Illinois; Hill Air Force Base, Utah; and Edwards Air Force Base, California. If these studies indicate that it is beneficial for the Air Force to privatize some systems, the Air Force may relocate its engineering personnel to a few specific bases, where it will retain ownership of the utilities systems, so that airmen may receive the required training. This concentration of training will enable the other base utility systems to be privatized, while still providing the capability to train members to perform the required critical skills associated with operation of the systems. (Vinger, November 22, 1996)

2. Interested Party

An important element required for successful privatization is a party interested in taking ownership of the system (Thumma, November 22, 1996). Unless there is an interested party, DoD cannot sell its system. In the case of NAVWEPSTA Earle, New Jersey American Water Company (NJAWC) was interested in obtaining ownership of the potable water distribution system in the summer of 1995 (Thumma, November 22, 1996). However, it lost interest prior to the time when the Navy would have been able to receive Congressional approval for the privatization. (Thumma, November 22, 1996) This case will be discussed in more detail in Chapter IV.

3. Legal Liability

Legal liability covers who will be the responsible party for cleanup of an environmental hazard which is discovered after privatization occurs (McCulla, November

22, 1996). The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) ensures that the Government will be responsible for the cleanup of any contaminated property prior to transferring it to a new owner or if in the future the new owner can prove that the property was contaminated while under the Government's control (McCulla, November 27, 1996). Regardless of this act, all implementation plans must address the crucial item of legal liability (Brasse, 1996, p. 14). Therefore, a preliminary Environmental Impact Statement (EIS) must be performed for all utilities which DoD is considering privatizing (McCulla, November 22, 1996). The EIS lists the historical land usage, for example, whether there was ever an oil depot or an ammunition stockpile on that location. The EIS is intended to protect both the contractor and DoD from being falsely accused of contaminating a site. The EIS documents the condition of the land and identifies any toxic areas which require clean up before the Government transfers the utility system to private industry. (McCulla, November 22, 1996) The degree of legal liability is one of the greatest fears a private firm has in taking ownership of an existing Government utility system. (Brasse, 1996, p. 14) The EIS gives the contractor confidence about the condition of the site before ownership is transferred.

4. Lack of Control/Enforcement Mechanisms

When a service is privatized, in general, it no longer comes under the control of the Government (Ashley, November 22, 1996). Government is just another client, without the special privileges of ownership (Thumma, November 22, 1996). The transfer must be structured so that both the Government and the new private owner benefit. Measures must be included which state the minimal level of service required (Thumma, November 22,

1996). As a final precaution, the Army requires its privatization agreements to include a reversion clause for failure to serve. (Brasse, 1996, p. 15) However, the burden is on the Government to prove a quality or noncompliance issue (McCulla, November 22, 1996).

B. CONGRESSIONAL LEGISLATION

Currently, DoD is working with Congress on three specific legislative matters which are impediments to privatization of utility systems: the Contribution-in-Aid-of-Construction (CIAC) Tax, the request for authority to approve privatization at the level of the Secretaries of the Services, (Bryan, 1996) and a Fair Market Value ruling. (McCulla, November 4, 1996) The following discussion explains these three issues.

1. CIAC Tax

This tax requires that the new owners of utility systems pay taxes on the difference between the price paid for the system and the amount the Internal Revenue Service (IRS) deems to be the fair market value of the acquired system (McCulla, November 22, 1996). This amount is taxed at the 34 percent corporate tax rate (McCulla, November 27, 1996). Depending upon a private utility company's charter, the tax may have to be charged as a fee to the one customer who caused it. If this is the case, the Government would pay approximately 49 percent of the fair-market value amount on which the IRS taxed the company through the increase in the service's rate structure, substantially reducing the savings to be reaped through privatization. (McCulla, November 22, 1996)

Public Law 104-188, H.R. 3448, Section 1613, passed on August 20, 1996, waived this tax for transfers for water or sewage disposal services. However, to date no such waiver

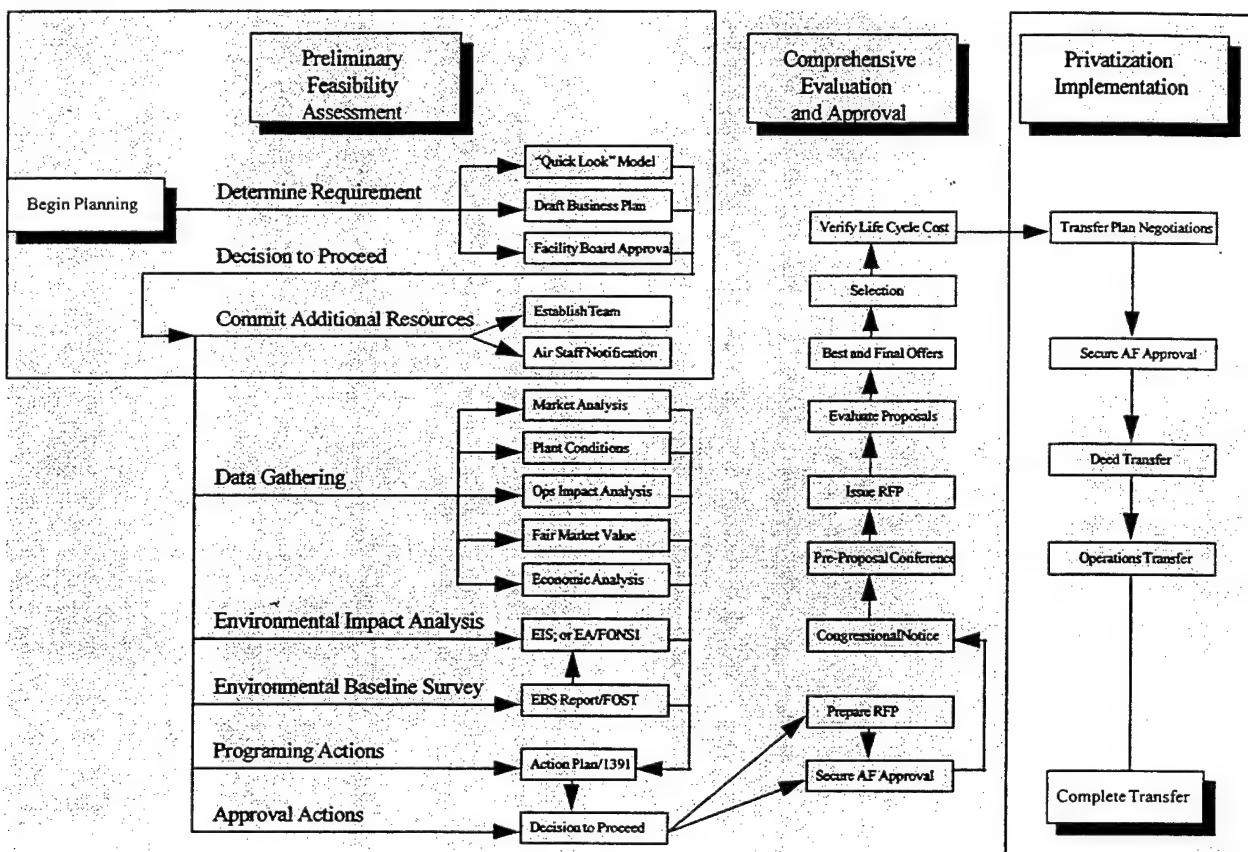
is authorized for gas and electric systems (McCulla, November 4, 1996). Proposed DoA legislation to correct this oversight is not expected to be signed until fiscal year 1999. (McCulla, November 4, 1996)

2. Authorization Level

The Navy and the Air Force have interpreted current legislation as requiring Congressional approval to privatize any utility system (Ashley, November 22, 1996; Vinger, November 22, 1996). The Air Force Utilities Privatization Process, found on page 28, illustrates the Air Force's tentative privatization flowchart. This flowchart assumes that the Secretary of the Air Force will be authorized to approve privatization initiatives. (Vinger, November 22, 1996) The Privatization Flowchart for Army & Navy, found on pages 29-32, depicts the steps currently required for these Services to achieve utilities privatization. It illustrates the attempt to have a unified process for privatization, but page 32 shows that there is no single model (Ashley, November 22, 1996). The Army's policy differs and specifies approval authority with the Secretary of the Army, but requires a 21-day Congressional notification period, for any privatization which does not involve the transfer of land, as shown on page 32. (McCulla, November 22, 1996)

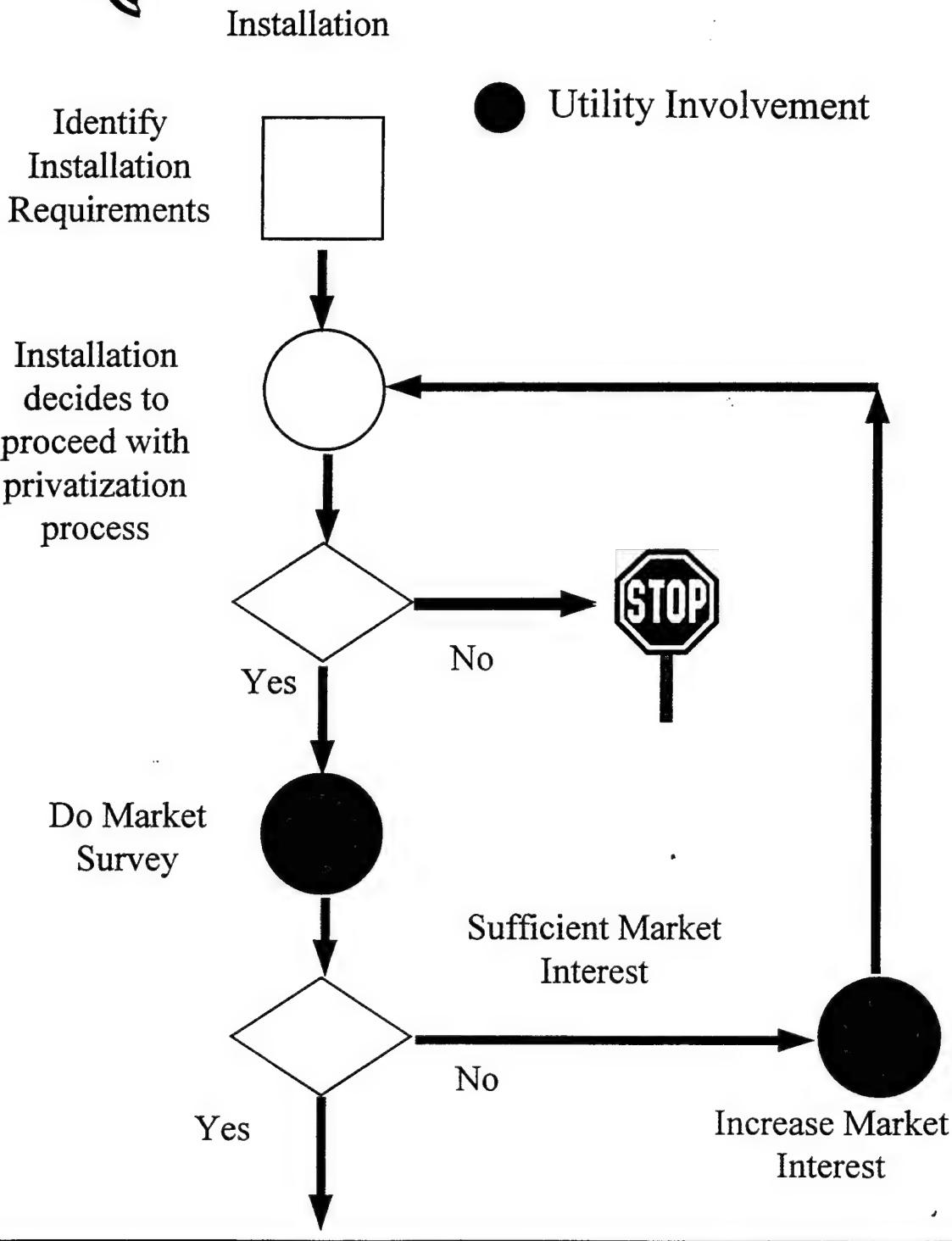
The process of securing Congressional authorization begins with drafting a proposal for the transfer of the utility system, with supporting economic analysis (McCulla, November 4, 1996). This proposal is added to the Congressional docket, reviewed by members and if approved, transfer is authorized (McCulla, November 4, 1996). However, market conditions can change between initial analysis and the time of voting (Thumma, November 22, 1996).

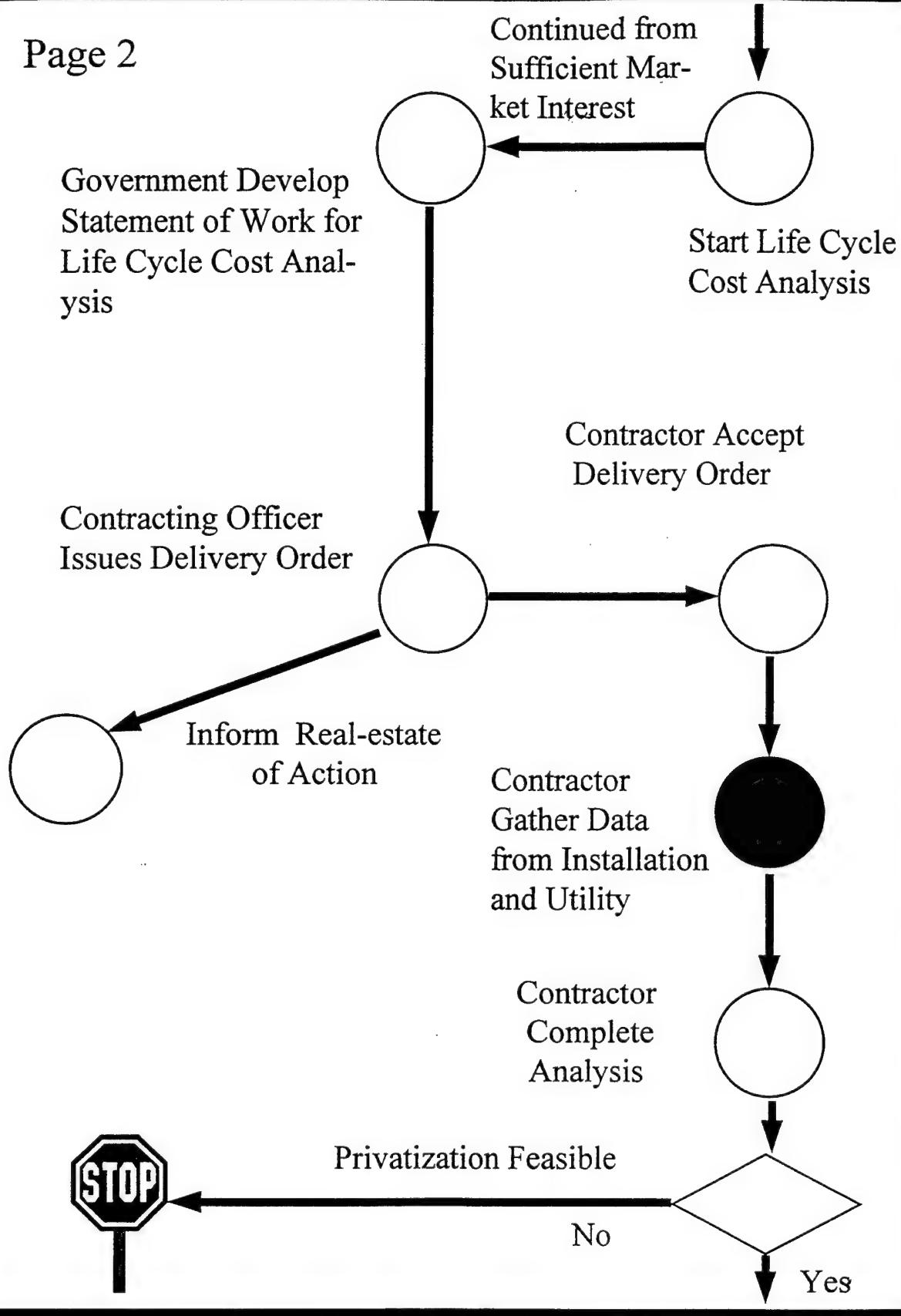
Air Force Utilities Privatization Process

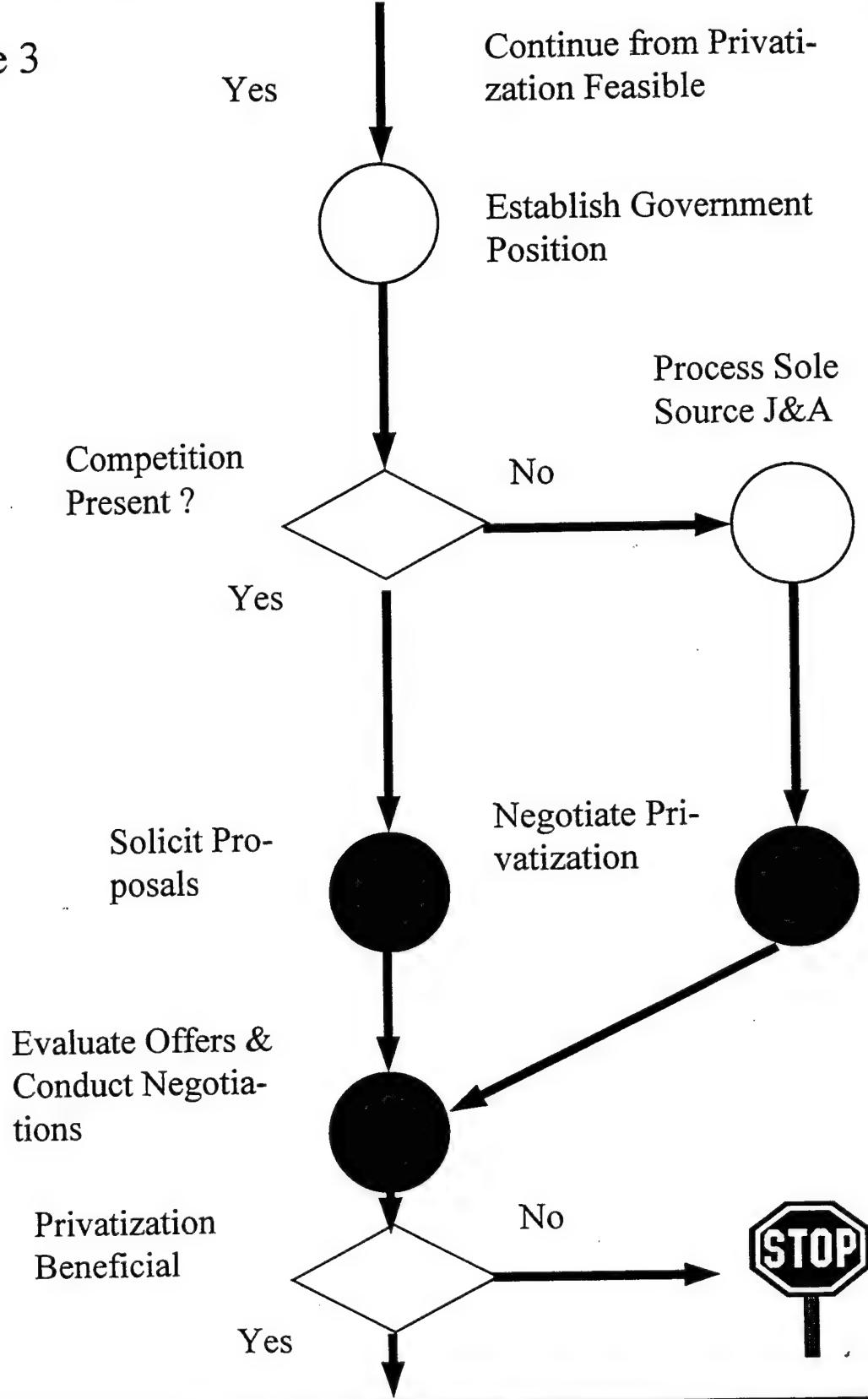


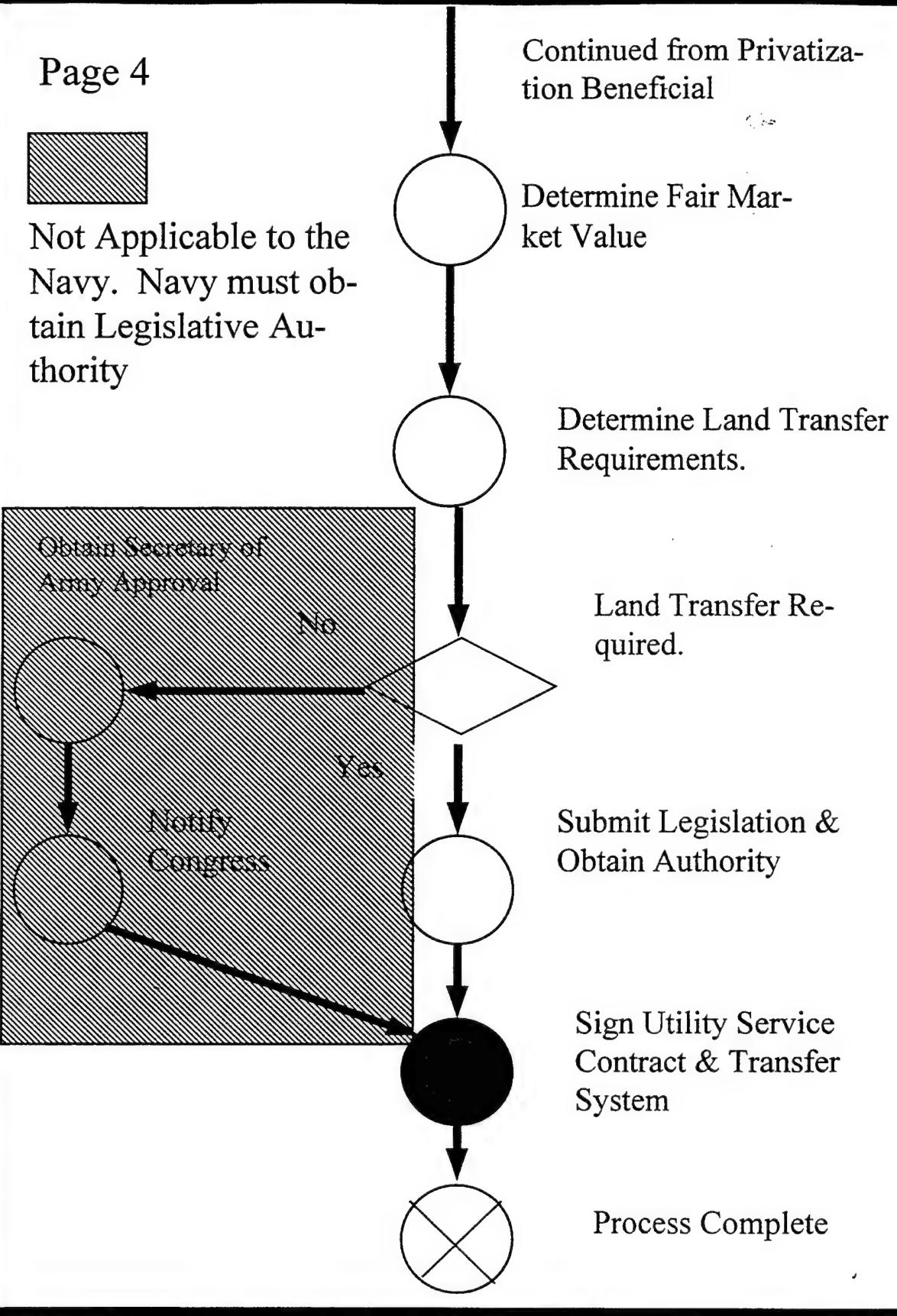


Privatization Flowchart For Army & Navy









Also, the private firm may lose interest in the acquisition, as will be discussed in Chapter IV, the NAVWEPSTA Earle, New Jersey, case study.

To remove these impediments, the Military Services have drafted legislative proposals to change the authority level required to approve a privatization proposal to the level of the Secretary of the Military Department (Ashley, November 22, 1996; McCulla, November 22, 1996; Vinger, November 22, 1996). If approved, the Military Services will still submit an economic analysis of the proposed privatization to the Congressional Military Construction Committee for approval (Vinger, November 22, 1996). If, at the end of 21 days, the committee has not made any comments regarding the privatization, it is considered approved. This legislative proposal is expected to be reviewed by Congress in fiscal year 1997 and would shorten the transfer process by approximately two years. (Vinger, November 22, 1996)

3. Fair Market Value

Currently, Title 40 of the United States Code, Section 484, and Chapter 41 of the Code of Federal Regulations, Chapter 101, Part 47, Subpart 305-1, require that a minimum of fair market value be received for the transfer of property (McCulla, November 4, 1996; United States Code, 1995; Code of Federal Regulations, 1995). The DoA is drafting language for Congressional approval to specify that recoupment of the fair market value be in any form considered to be beneficial to the Government. This determination could include alternate methods such as applying a facility credit over the life cycle of the utility system. Currently, if a company purchases a utility system for a lump sum of money, the investment must be financed. In turn, any interest expense is passed on to the consumer who pays

through higher rates. The DoA believes that the passage of this legislation will be a win-win situation for everyone. Industry can reduce its initial investment to purchase a utility and the Military Services are not subject to higher rates resulting from the initial outlay required to obtain the system. (McCulla, November 4, 1996)

IV. PRIVATIZATION CASE STUDY

Privatization has become popular in DoD because it is seen as a way to relieve the Military Services of their current burden of "...failing utilities, aging technology, huge maintenance and repair backlog, mandated downsizing, and mounting safety and environmental concerns (Eng, 1996, p. 4)." DoD has adopted a policy which fosters the privatization of noncore functions. Government-owned utility systems is one area in which DoD recommends privatization when an economic analysis shows it to be in the Government's best interest. This means that the privatization would save money without jeopardizing the reliability of service or the security of the mission (C. H. Guernsey & Company, August 1995, p. 1-2). The Navy hired engineering consultants, C. H. Guernsey & Company, to perform a privatization study of NAVWEPSTA Earle, New Jersey to determine the feasibility of privatizing it. To date, this is the only completed privatization study of a Navy potable water distribution system.

Guernsey examined Earle's electrical distribution system and potable water distribution system "...to address the costs and benefits associated with the potential privatization of the Station's utility systems (C. H. Guernsey & Company, 1995, p. 1-1)." This chapter presents the Guernsey study of Earle's potable water distribution system. The analysis will then be used in the next chapter as a framework for analyzing whether or not it is in the best interest of the Government to privatize the potable water distribution systems of the Jacksonville Military Complex.

Guernsey considered three alternatives in their study. Alternative 1 maintained the status quo, Government ownership, operation, and maintenance of the potable water distribution system. Alternative 2 considered selling the system to New Jersey American Water Company (NJAWC) for its bid price of \$1.1 million. Alternative 3 contemplates selling the water system to NJAWC for \$2 million, the value that Guernsey calculated to be its fair-market value. (C. H. Guernsey & Company, August 1995, p. 1-5) Guernsey uses a \$2 million value for their calculations of alternative 3, although it refers to this value as \$1.9 million in the text of its study. For purposes of this thesis, alternative 3 will be referred to as the \$2 million system value. In order to ascertain which alternative was in the best interest of the Government, Guernsey performed numerous financial calculations to determine the net present value (NPV) of the costs of each alternative. The alternative found to have the smallest NPV is the one which is in the best interest of the Government. This chapter will look at each of the three alternatives to see which one has the smallest NPV and to gain an understanding of the types of calculations required when considering privatization of a potable water distribution system. Chapter V will then apply these types of calculations to the Jacksonville Military Complex's water systems.

A. NAVWEPSTA EARLE, NEW JERSEY

The NAVWEPSTA Earle's mission is to receive, renovate, store and issue ammunition, explosives, expendable items and/or weapons and technical ordnance material and perform additional tasks as directed by the Commander of Naval Sea Systems Command. It is one of the Navy's three major ammunition depots which support the

Atlantic Fleet. Three Ammunition Auxiliary Ships (AE) and two Fuel and Ammunition Auxiliary Ships (AOE) are homeported at Earle. The base has two major land areas, Mainside (10,160 acres and 301 buildings with 1,693,000 gross square footage (gsf) of building space) and Waterfront (705 acres, 53 buildings with 297,000 gsf of building space, and a 2-mile trestle serving four piers). These two areas are connected by a 15-mile long (253 acres) road and railroad line. (C. H. Guernsey & Company, August 1995, p. 2-1)

The NAVWEPSTA Earle has two separate potable water distribution systems, the majority of which was constructed in the early 1940s. The Mainside's system comprises approximately 116,525 linear feet of water lines, and the Waterfront and Pier areas contain approximately 26,140 linear feet of water lines. The distribution system also includes five water storage tanks, one tank with a 300,000 gallon capacity and the other four tanks with 250,000 gallon capacity each. The Station does not currently use any of these tanks. (C. H. Guernsey & Company, August 1995, p. 2-8)

The NAVWEPSTA Earle's quality of water meets or exceeds the Environmental Protection Agency (EPA) and New Jersey state environmental standards. Its potable water distribution system is highly reliable. Both base personnel and contractors maintain and repair the system, resulting in minimal disruptions of service and down-time. (C. H. Guernsey & Company, August 1995, p. 2-9)

B. ALTERNATIVE 1 - STATUS QUO

The Government continues to own, operate, and maintain the water system , but buys water from NJAWC. Table 1 summarizes this alternative's NPV calculations.

Table 1. Life-Cycle Cost Report: Alternative 1-Status Quo

Year	Water Purchases (01)	O&M Expenses (02)	Unit Cost of Capital (03)	Admin & Overhead (04)	Total Annual Outlays (05)	MOY Factors (06)	Present Value (07)	Cumulative Net Present Value (08)
1996	\$ 592,709	\$ 101,143	\$ 112,920	\$ 20,850	\$ 827,622	0.968	\$ 800,841	\$ 800,841
1997	\$ 612,105	\$ 103,419	\$ 115,179	\$ 21,319	\$ 852,022	0.906	\$ 771,959	\$ 1,572,800
1998	\$ 631,827	\$ 105,694	\$ 117,482	\$ 21,788	\$ 876,791	0.848	\$ 743,821	\$ 2,316,621
1999	\$ 652,185	\$ 108,020	\$ 119,832	\$ 22,267	\$ 902,304	0.794	\$ 716,726	\$ 3,033,347
2000	\$ 673,198	\$ 110,396	\$ 122,229	\$ 22,757	\$ 928,580	0.744	\$ 690,636	\$ 3,723,983
2001	\$ 694,888	\$ 112,825	\$ 124,673	\$ 23,258	\$ 955,644	0.696	\$ 665,509	\$ 4,389,492
2002	\$ 717,277	\$ 115,307	\$ 127,167	\$ 23,769	\$ 983,520	0.652	\$ 641,313	\$ 5,030,805
2003	\$ 740,389	\$ 117,844	\$ 129,710	\$ 24,292	\$ 1,012,235	0.611	\$ 618,011	\$ 5,648,816
2004	\$ 764,244	\$ 120,436	\$ 132,304	\$ 24,827	\$ 1,041,811	0.572	\$ 595,571	\$ 6,244,387
2005	\$ 788,867	\$ 123,086	\$ 134,950	\$ 25,373	\$ 1,072,276	0.535	\$ 573,957	\$ 6,818,344
2006	\$ 814,284	\$ 125,794	\$ 137,649	\$ 25,931	\$ 1,103,658	0.501	\$ 553,142	\$ 7,371,486
2007	\$ 840,522	\$ 128,561	\$ 140,402	\$ 26,502	\$ 1,135,987	0.469	\$ 533,095	\$ 7,904,581
2008	\$ 867,602	\$ 131,390	\$ 143,210	\$ 27,085	\$ 1,169,287	0.439	\$ 513,783	\$ 8,418,364
2009	\$ 895,557	\$ 134,280	\$ 146,074	\$ 27,681	\$ 1,203,592	0.411	\$ 495,184	\$ 8,913,548
2010	\$ 924,412	\$ 137,234	\$ 148,996	\$ 28,289	\$ 1,238,931	0.385	\$ 477,269	\$ 9,390,817
2011	\$ 954,196	\$ 140,253	\$ 151,976	\$ 28,912	\$ 1,275,337	0.361	\$ 460,013	\$ 9,850,830
2012	\$ 984,940	\$ 143,339	\$ 155,015	\$ 29,548	\$ 1,312,842	0.338	\$ 443,390	\$ 10,294,220
2013	\$ 1,016,676	\$ 146,493	\$ 158,116	\$ 30,198	\$ 1,351,483	0.316	\$ 427,379	\$ 10,721,599
2014	\$ 1,049,433	\$ 149,715	\$ 161,278	\$ 30,862	\$ 1,391,288	0.296	\$ 411,954	\$ 11,133,553
2015	\$ 1,083,245	\$ 153,009	\$ 164,504	\$ 31,541	\$ 1,432,299	0.277	\$ 397,096	\$ 11,530,649
2016	\$ 1,118,147	\$ 156,375	\$ 167,794	\$ 32,235	\$ 1,474,551	0.260	\$ 382,781	\$ 11,913,430
2017	\$ 1,154,175	\$ 159,816	\$ 171,150	\$ 32,944	\$ 1,518,085	0.243	\$ 368,990	\$ 12,282,420
2018	\$ 1,191,361	\$ 163,331	\$ 174,573	\$ 33,669	\$ 1,562,934	0.228	\$ 355,703	\$ 12,638,123
2019	\$ 1,229,748	\$ 166,925	\$ 178,064	\$ 34,410	\$ 1,609,147	0.213	\$ 342,904	\$ 12,981,027
2020	\$ 1,269,370	\$ 170,597	\$ 181,625	\$ 35,167	\$ 1,656,759	0.200	\$ 330,570	\$ 13,311,596

1. Annual Water Consumption

Column (01) of Table 1 involves water purchases from NJAWC. To determine this figure, the Station's annual water consumption must first be calculated. Consumption on NAVWEPSTA Earle is monitored at sixteen different meters, four of which account for approximately 98.5% of usage (C. H. Guernsey & Company, 1995, p. 3-7). Table 2 lists the FY 1994 Station consumption, which totaled 156,200 kgal, by location.

Table 2. Summary of NAVWEPSTA Earle's FY1994 Water Consumption per Meter

Meter Number	Location	Meter Size	Usage(kgal)	Percent
1	Mainside	4"	81,220	52.00
2	Mainside	2"	3	0.00
3	Mainside	3 1/4"	0	0.00
4	Waterfront Piers	2"	40,517	25.93
5	Waterfront Piers	2"	22,127	14.16
6	Waterfront Admin	2 1/2"	0	0.00
7	Waterfront Admin	5/8"	0	0.00
8	Waterfront Admin	6"	10,130	6.48
9	Waterfront Admin	6"	1,330	0.85
10	Waterfront Admin	4"	11	0.01
11	Waterfront Admin	2"	677	0.43
12	Waterfront Admin	4"	218	0.14
13	Waterfront Admin	1 5/8"	0	0.00
14	Waterfront Admin	2 5/8"	0	0.00
15	Waterfront Admin	2 5/8"	0	0.00
16	Waterfront Admin	2 5/8"	0	0.00

Future water consumption at NAVWEPSTA Earle is dependent upon the waterfront activities, i.e. how many ships are in port and their length of stay. C. H. Guernsey assumed that the Station's requirements for potable water would increase at 1.0 percent per year until the year 2005 and at 0.5 percent thereafter through the year 2020, when its 25-year life-cycle cost analysis concludes. (C. H. Guernsey & Company, August 1995, p. 3-8)

The water purchased by NAVWEPSTA Earle is charged at Rate Schedule B, Table 3 (C. H. Guernsey & Company, August 1995, p. 3-8).

Table 3. NJAWC Rate Schedule B - General Service Rate Components

Meter Size	Fee per month	Fee per quarter
5/8"	\$ 5.73	\$ 13.69
3/4"	\$ 8.60	\$ 25.80
1"	\$ 14.33	\$ 42.99
1 1/2"	\$ 28.65	\$ 85.95
2"	\$ 45.84	\$ 137.50
3"	\$ 85.95	\$ 257.85
4"	\$ 143.25	\$ 429.75
6"	\$ 286.50	\$ 859.50
8"	\$ 458.40	\$ 1,375.20

To compute the monthly cost of water purchased, the meter size of each location must be known. Table 2 mentions the size of each meter found at the 16 locations where Earle records consumption. The monthly consumption is multiplied by the charge per kgal of water, which is then added to the monthly fee, found in Table 3, for that meter size. It is interesting to note that Rate Schedule B is NJAWC's retail rates, which factor in the cost of

repairs to a system and a share of the fee required to repay an investment. Although NJAWC did not maintain the Earle system, the Station was being charged as if it did. (Kilway, November 25, 1996) Atlantic Division of NAVFAC (LANTDIV), which contracts the water service on Earle, has not tried to negotiate this rate down to a level which excludes charges for repairs to the system, as it is pursuing privatization of the system. NJAWC has stated that, if it takes ownership of the system, it will continue to serve the Station under Rate Schedule B, without any additional billing. If privatization does not occur, LANTDIV intends to negotiate a rate schedule which does not include these additional charges (Thumma, November 22, 1996).

2. Operations & Maintenance Expenses

This expense includes all costs associated with the daily operations of the water system, as well as any repairs and maintenance which have to be performed to the system. The Station's O&M expenses for FY1994 were \$117,000, and C. H. Guernsey projected them to be \$100,000 for FY1995, based upon a three-man potable water distribution/wastewater collection crew. (C. H. Guernsey & Company, August 1995, p. 2-9) Column (02) of Table 1 projects these costs to increase at the rate of inflation over the study's 25-year period.

3. Unit Cost of Capital

The unit cost of capital term included in this analysis is the Government's imputed cost of money and may be found in Table 4 and in column (03) of Table 1. Typically, the Government finances its investments with debt, which has an interest rate of 6-7 percent (Kilway, November 25, 1996). The unit cost of capital used in this study is 10 percent to

reflect the depreciation and other carrying charges typically associated with a private sector investment. Guernsey was directed by the Army and Navy to use 10 percent for this figure, to achieve a common framework to compare the total cost to serve with the privatization alternatives. (Hobie, December 3, 1996).

To calculate the unit cost of capital, first the fair-market value for the potable water distribution system must be determined. Guernsey's calculations for the fair-market value utilized replacement cost less accumulated depreciation. This net amount was computed by multiplying the replacement cost

...by the ratio of the remaining useful life to the useful life of a new facility. Regardless of age of the specific component, the minimum ratio utilized was 20 percent. All piping, buildings and concrete structures were assumed to have a useful life of 50 years. (C. H. Guernsey & Company, August 1995, p. 2-10)

This fair-market value is multiplied by 10 percent to obtain a starting place for the unit cost of capital calculation as shown in column (01) of Table 4. The Earle study assumed that the Station would invest 2 percent of its existing plant value per year in new system replacements and improvements as shown in column (02) of Table 4. (C. H. Guernsey, August 1995, p. 4-7) This 2 percent figure came from historical data which indicated DoD spends approximately 2.2 percent per year on these types of improvements (Kilway, November 25, 1996). This study did not provide a credit for depreciation, which Guernsey now believes is appropriate. Columns (01) and (02) of Table 4 are added together to determine the ending value, column (03), which is then multiplied by 10 percent to arrive at that year's unit cost of capital, column (05).

Table 4. Unit Cost of Capital Calculation

Year	Beginning (01)	Additions (02)	Ending (03)	% Rate (04)	Unit Cost of Capital (05)
1995	\$ 1,107,062	\$ 0	\$ 1,107,062	10.00%	
1996	\$ 1,107,062	\$ 22,141	\$ 1,129,203	10.00%	\$ 112,920
1997	\$ 1,129,203	\$ 22,584	\$ 1,151,787	10.00%	\$ 115,179
1998	\$ 1,151,787	\$ 23,036	\$ 1,174,823	10.00%	\$ 117,482
1999	\$ 1,174,823	\$ 23,496	\$ 1,198,320	10.00%	\$ 119,832
2000	\$ 1,198,320	\$ 23,966	\$ 1,222,286	10.00%	\$ 122,229
2001	\$ 1,222,286	\$ 24,446	\$ 1,246,732	10.00%	\$ 124,673
2002	\$ 1,246,732	\$ 24,935	\$ 1,271,666	10.00%	\$ 127,167
2003	\$ 1,271,666	\$ 25,433	\$ 1,297,100	10.00%	\$ 129,710
2004	\$ 1,297,100	\$ 25,942	\$ 1,323,042	10.00%	\$ 132,304
2005	\$ 1,323,042	\$ 26,461	\$ 1,349,502	10.00%	\$ 134,905
2006	\$ 1,349,502	\$ 26,990	\$ 1,376,492	10.00%	\$ 137,649
2007	\$ 1,376,492	\$ 27,530	\$ 1,404,022	10.00%	\$ 140,402
2008	\$ 1,404,022	\$ 28,080	\$ 1,432,103	10.00%	\$ 143,210
2009	\$ 1,432,103	\$ 29,462	\$ 1,460,745	10.00%	\$ 146,074
2010	\$ 1,460,745	\$ 29,215	\$ 1,489,960	10.00%	\$ 148,996
2011	\$ 1,489,960	\$ 29,799	\$ 1,519,759	10.00%	\$ 151,976
2012	\$ 1,519,759	\$ 30,395	\$ 1,550,154	10.00%	\$ 155,015
2013	\$ 1,550,154	\$ 31,003	\$ 1,581,157	10.00%	\$ 158,116
2014	\$ 1,581,157	\$ 31,623	\$ 1,612,780	10.00%	\$ 161,278
2015	\$ 1,612,780	\$ 32,256	\$ 1,645,036	10.00%	\$ 164,504
2016	\$ 1,645,036	\$ 32,901	\$ 1,677,937	10.00%	\$ 167,794
2017	\$ 1,677,937	\$ 33,559	\$ 1,711,495	10.00%	\$ 171,150
2018	\$ 1,711,495	\$ 34,230	\$ 1,745,725	10.00%	\$ 174,573
2019	\$ 1,745,725	\$ 34,915	\$ 1,780,640	10.00%	\$ 178,064
2020	\$ 1,780,640	\$ 35,613	\$ 1,816,253	10.00%	\$ 181,625

4. Administrative and Overhead Expenses

Guernsey estimated this cost to be 3 percent of the sum of NAVWEPSTA Earle's annual water purchases and O&M expenses. In FY1995, this expense was computed to be \$20,614 (C. H. Guernsey & Company, August 1995, p. 4-7) Guernsey's calculations for this figure, projected to increase at the rate of inflation over the study's 25-year period, are located in column (04) of Table 1.

5. Net Present Value Calculation for Alternative 1

The purpose of Table 1 is to calculate the Net Present Value for alternative 1. In order to determine this figure, numerous calculations must be made. Column (05) of Table 1, total annual outlays, is a sum of columns (01) - (04). This value is then multiplied by the middle of the year (MOY) discount factor at 6.8 percent in column (06) to arrive at the present value of the annual outlays, column (07). Guernsey was directed to use a 6.8 percent discount rate by the Navy (Hobie, December 3, 1996). Finally, the cumulative NPV is calculated in column (08) by summing all of the year's present values. The result of the calculations for alternative 1 is a NPV of \$13,311,597.

C. ALTERNATIVE 2 - NJAWC's \$1.1 MILLION BID PRICE

Table 5 provides a detailed list of the calculations performed for this alternative. Column (01) of Table 5, water purchases, is the same for this alternative as it is for alternative 1. Column (02) of Table 5, facilities credit, is a new calculation.

Table 5. Life-Cycle Cost Report: Alternative 2-NJAWC's \$1.1 Million Bid Price

Year	Water Purchases (01)	Facilities Credit (02)	Total Annual Outlays (03)	MOY Factors (04)	Present Value (05)	Cumulative Net Present Value (06)
1996	\$ 592,709	\$180,168)	\$ 412,541	0.968	\$ 399,191	\$ 399,191
1997	\$ 612,105	\$180,168)	\$ 431,937	0.906	\$ 391,348	\$ 790,539
1998	\$ 631,827	\$180,168)	\$ 451,659	0.848	\$ 383,163	\$ 1,173,702
1999	\$ 652,185	\$180,168)	\$ 472,017	0.794	\$ 374,937	\$ 1,548,639
2000	\$ 673,198	\$180,168)	\$ 493,030	0.744	\$ 366,694	\$ 1,915,333
2001	\$ 694,888	\$180,168)	\$ 514,720	0.696	\$ 358,450	\$ 2,273,783
2002	\$ 717,277	\$180,168)	\$ 537,109	0.652	\$ 350,227	\$ 2,624,010
2003	\$ 740,389	\$180,168)	\$ 560,221	0.611	\$ 342,038	\$ 2,966,048
2004	\$ 764,244	\$180,168)	\$ 584,076	0.572	\$ 333,898	\$ 3,299,946
2005	\$ 788,867	\$180,168)	\$ 608,699	0.535	\$ 325,819	\$ 3,625,765
2006	\$ 814,284	\$ 0	\$ 814,284	0.501	\$ 408,111	\$ 4,033,876
2007	\$ 840,522	\$ 0	\$ 840,522	0.469	\$ 394,439	\$ 4,428,315
2008	\$ 867,602	\$ 0	\$ 867,602	0.439	\$ 381,224	\$ 4,809,539
2009	\$ 895,557	\$ 0	\$ 895,557	0.411	\$ 368,452	\$ 5,177,991
2010	\$ 924,412	\$ 0	\$ 924,412	0.385	\$ 356,108	\$ 5,534,099
2011	\$ 954,196	\$ 0	\$ 954,196	0.361	\$ 344,178	\$ 5,878,277
2012	\$ 984,940	\$ 0	\$ 984,940	0.338	\$ 332,647	\$ 6,210,924
2013	\$ 1,016,676	\$ 0	\$ 1,016,676	0.316	\$ 321,503	\$ 6,532,427
2014	\$ 1,049,433	\$ 0	\$ 1,049,433	0.296	\$ 310,732	\$ 6,843,159
2015	\$ 1,083,245	\$ 0	\$ 1,083,245	0.277	\$ 300,322	\$ 7,143,481
2016	\$ 1,118,147	\$ 0	\$ 1,118,147	0.260	\$ 290,261	\$ 7,433,742
2017	\$ 1,154,175	\$ 0	\$ 1,154,175	0.243	\$ 280,537	\$ 7,714,279
2018	\$ 1,191,361	\$ 0	\$ 1,191,361	0.228	\$ 271,138	\$ 7,985,417
2019	\$ 1,229,748	\$ 0	\$ 1,229,748	0.213	\$ 262,055	\$ 8,247,472
2020	\$ 1,269,370	\$ 0	\$ 1,269,370	0.200	\$ 253,275	\$ 8,500,747

1. Facilities Credit

NJAWC would not pay the Government \$1.1 million in cash upon transfer of the facilities to it from the Government. Rather, the facilities credit is used to repay the Government the estimated fair-market value of the Station's system over a 10-year period to lessen the financial burden resulting from the purchase and thereby offset a potential rate increase which this investment would cause. The facilities credit amounts to a constant annual payment to the Government by the company to whom the utilities system was sold in the privatization. It is calculated for a 10-year payback due to Federal Acquisition Regulation Part 41, Subpart 103, which limits the Government's maximum contract length to 10 years. Each payment includes principal and interest at 10 percent. (C. H. Guernsey & Company, August 1995, p. 4-7) It is similar to a mortgage payment in that payments are constant, including more interest in the earlier years and a larger percentage of principal in the later years. Table 6 illustrates this calculation.

2. Net Present Value Calculation for Alternative 2

The purpose of Table 5 is to calculate the Net Present Value for alternative 2. Just as for alternative 1, this entails performing numerous calculations. Column (03) of Table 5, total annual outlays, is a sum of columns (01) and (02). This value is then multiplied by the middle of the year (MOY) discount factor at 6.8 percent, found in column (04) to arrive at the present value of the annual outlays, column (05). Finally, the cumulative NPV is calculated in column (06) by summing all of the year's present values. The result of the calculations for alternative 2 is a NPV of \$8,500,747.

Table 6. Facilities Credit Calculation-Alternative 2

Year	Beginning	Interest	Facilities Credit	Ending	% Rate
Baseline	\$ 1,107,062	\$ 0	\$ 0	\$ 1,107,062	10.00%
1996	\$ 1,107,062	\$ 110,706	\$ (180,169)	\$ 1,037,599	10.00%
1997	\$ 1,037,599	\$ 103,760	\$ (180,169)	\$ 961,190	10.00%
1998	\$ 961,190	\$ 96,119	\$ (180,169)	\$ 877,139	10.00%
1999	\$ 877,139	\$ 87,714	\$ (180,169)	\$ 784,684	10.00%
2000	\$ 784,684	\$ 78,468	\$ (180,169)	\$ 682,983	10.00%
2001	\$ 682,983	\$ 68,298	\$ (180,169)	\$ 571,112	10.00%
2002	\$ 571,112	\$ 57,111	\$ (180,169)	\$ 448,054	10.00%
2003	\$ 448,054	\$ 44,805	\$ (180,169)	\$ 312,690	10.00%
2004	\$ 312,690	\$ 31,269	\$ (180,169)	\$ 163,790	10.00%
2005	\$ 163,790	\$ 16,379	\$ (180,169)	\$ 0	10.00%

D. ALTERNATIVE 3 - GUERNSEY'S \$2 MILLION PRICE

The difference between alternatives 2 and 3 is found in the facilities credit amounts generated by the different sales prices. Table 7 contains this alternative's facility credit calculations.

Table 8 is the life-cycle cost report for Alternative 3. Its purpose is to calculate the Net Present Value for alternative 3. Just as for alternative 2, Column (03) of Table 8, total annual outlays, is a sum of columns (01) and (02). This value is then multiplied by the middle of the year (MOY) discount factor at 6.8 percent, found in column (04) to arrive at the present value of the total annual outlays, column (05). Finally, the cumulative NPV is

calculated in column (06) by summing all of the year's present values. The result of the calculations for alternative 3 is a NPV of \$7,375,814.

Table 7. Facilities Credit Calculation-Alternative 3

Year	Beginning	Interest	Facilities Credit	Ending	% Rate
Baseline	\$ 2,050,580	\$ 0	\$ 0	\$ 2,050,580	10.00%
1996	\$ 2,050,580	\$ 205,058	\$ (333,722)	\$ 1,921,916	10.00%
1997	\$ 1,921,916	\$ 192,192	\$ (333,722)	\$ 1,780,385	10.00%
1998	\$ 1,780,385	\$ 178,038	\$ (333,722)	\$ 1,624,701	10.00%
1999	\$ 1,624,701	\$ 162,470	\$ (333,722)	\$ 1,453,448	10.00%
2000	\$ 1,453,448	\$ 145,345	\$ (333,722)	\$ 1,265,071	10.00%
2001	\$ 1,265,071	\$ 126,507	\$ (333,722)	\$ 1,057,855	10.00%
2002	\$ 1,057,855	\$ 105,786	\$ (333,722)	\$ 829,918	10.00%
2003	\$ 829,918	\$ 82,992	\$ (333,722)	\$ 579,188	10.00%
2004	\$ 579,188	\$ 57,919	\$ (333,722)	\$ 303,384	10.00%
2005	\$ 303,384	\$ 30,338	\$ (333,722)	\$ 0	10.00%

E. CONCLUSIONS AND RECOMMENDATIONS OF STUDY

C. H. Guernsey offered conclusions and recommendations based upon the results of their life-cycle cost analysis calculations for the three alternatives studied. Table 9 is a summary of this analysis. (C. H. Guernsey & Company, August 1995, p. 4-8)

Table 8. Life-Cycle Cost Report: Alternative 3-Guernsey's \$2 Million Price

Year	Water Purchases (01)	Facilities Credit (02)	Total Annual Outlays (03)	MOY Factors (04)	Present Value (05)	Cumulative Net Present Value (06)
1996	\$ 592,709	\$(333,721)	\$ 258,988	0.968	\$ 250,607	\$ 250,607
1997	\$ 612,105	\$ (333,721)	\$ 278,384	0.906	\$ 252,224	\$ 502,831
1998	\$ 631,827	\$ (333,721)	\$ 298,106	0.848	\$ 252,897	\$ 755,728
1999	\$ 652,185	\$ (333,721)	\$ 318,464	0.794	\$ 252,966	\$ 1,008,694
2000	\$ 673,198	\$ (333,721)	\$ 339,477	0.744	\$ 252,488	\$ 1,261,182
2001	\$ 694,888	\$ (333,721)	\$ 361,167	0.696	\$ 251,516	\$ 1,512,698
2002	\$ 717,277	\$ (333,721)	\$ 383,556	0.652	\$ 250,102	\$ 1,762,800
2003	\$ 740,389	\$ (333,721)	\$ 406,668	0.611	\$ 248,288	\$ 2,011,088
2004	\$ 764,244	\$ (333,721)	\$ 430,523	0.572	\$ 246,117	\$ 2,257,205
2005	\$ 788,867	\$ (333,721)	\$ 455,146	0.535	\$ 243,627	\$ 2,500,832
2006	\$ 814,284	\$ 0	\$ 814,284	0.501	\$ 408,111	\$ 2,908,943
2007	\$ 840,522	\$ 0	\$ 840,522	0.469	\$ 394,439	\$ 3,303,382
2008	\$ 867,602	\$ 0	\$ 867,602	0.439	\$ 381,224	\$ 3,684,606
2009	\$ 895,557	\$ 0	\$ 895,557	0.411	\$ 368,452	\$ 4,053,058
2010	\$ 924,412	\$ 0	\$ 924,412	0.385	\$ 356,108	\$ 4,409,166
2011	\$ 954,196	\$ 0	\$ 954,196	0.361	\$ 344,178	\$ 4,753,344
2012	\$ 984,940	\$ 0	\$ 984,940	0.338	\$ 332,647	\$ 5,085,991
2013	\$ 1,016,676	\$ 0	\$ 1,016,676	0.316	\$ 321,503	\$ 5,407,494
2014	\$ 1,049,433	\$ 0	\$ 1,049,433	0.296	\$ 310,732	\$ 5,718,226
2015	\$ 1,083,245	\$ 0	\$ 1,083,245	0.277	\$ 300,322	\$ 6,018,548
2016	\$ 1,118,147	\$ 0	\$ 1,118,147	0.260	\$ 290,261	\$ 6,308,809
2017	\$ 1,154,175	\$ 0	\$ 1,154,175	0.243	\$ 280,537	\$ 6,589,346
2018	\$ 1,191,361	\$ 0	\$ 1,191,361	0.228	\$ 271,138	\$ 6,860,484
2019	\$ 1,229,748	\$ 0	\$ 1,229,748	0.213	\$ 262,055	\$ 7,122,539
2020	\$ 1,269,370	\$ 0	\$ 1,269,370	0.200	\$ 253,275	\$ 737,581

Table 9. Summary of Potable Water Distribution System Life-Cycle Cost Analysis

Alternatives	Net Present Value
1. Status Quo	\$ 13,312,000
2. NJAWC's \$1.1M Proposal	\$ 8,501,000
3. Guernsey's \$2M Sales Value	\$ 7,376,000

Alternative 3, the \$2 million sales price, was calculated to save the Government \$5,936,000 compared to the status quo, over the 25-year study period. The NPV of the potable water distribution system was calculated to be 44.6 percent less for alternative 3 than for the status quo, while alternative 2 was calculated to be 36.1 percent less than the status quo (C. H. Guernsey & Company, August 1995, p. 4-8). Thus, C. H. Guernsey recommended that NAVWEPSTA Earle privatize this system.

C. H. Guernsey concluded that “privatization actions will provide a cost-effective means for continued safe and reliable potable water distribution service to the Station ...NAVWEPSTA Earle should enter into negotiations with NJAWC to secure a facilities acquisition and service arrangement (C. H. Guernsey & Company, August 1995, p. 4-8).”

F. WHAT ACTUALLY TRANSPired

Since the study was performed, no further events have taken place. The NJAWC had been interested in acquiring the base's potable water distribution system. The NJAWC's service area included a small section on the southwestern side of the Station where there had been no prior need for piping. A new cogeneration plant was proposed

for construction in this location, and NJAWC wanted to service it. Thus, NJAWC was interested in acquiring the Station's potable water distribution system in order to make a splice into it and have to run only a few thousand feet of pipe to service the new cogeneration site. However, NJAWC could not wait the amount of time forecasted to obtain Congressional approval. The NJAWC purchased a small water company located on the southwestern side of the Station and planned to run approximately the same amount of pipe from this new system to the cogeneration plant as it would have had to run from the Station. If Congressional approval had not been required, this facility would have been privatized in the late summer of 1995. (Thumma, November 22, 1996)

Currently, over one year since this study was completed, LANTDIV is discussing privatization of this system with NJAWC again. The cogeneration plant is still in the development stage, but NJAWC is now interested in obtaining the Station's system so that it will have redundancy in its lines in case either plant has technical difficulty. The numbers being used in this current scenario are quite different from those presented in this study. However, due to procurement sensitivity, they are not available for inclusion in this thesis. (Thumma, November 22, 1996)

V. PRIVATIZATION ANALYSIS OF THE JACKSONVILLE MILITARY COMPLEX POTABLE WATER DISTRIBUTION SYSTEMS

The Jacksonville Military Complex includes NAS Jacksonville, NAS Cecil Field, and NAVSTA Mayport. The logo of NAS Jacksonville is "Service to the Fleet." It is a master air and industrial base and occupies 3,400 acres of land. The NAS Jacksonville is home to 66 P-3C Orion long-range anti-submarine reconnaissance and maritime patrol aircraft, 31 SH-60F Seahawk anti-submarine warfare helicopters and H-3 Sea King helicopters, four C-9 and two C-12 aircrafts. (Public Affairs Office for Commander, Naval Base Jacksonville, 1996) The NAS Cecil Field's mission is "...to provide quality and responsive support to fleet units and tenants, outstanding facilities, a safe and healthy working and living environment, and a superb quality of life for Navy Marine Corps men and women and their dependents (Public Affairs Office for Commander, Naval Base Jacksonville, 1996)." The Base is the south's only master jet base. It is home to 197 FA-18 Hornet aircraft, 43 S-3B Viking aircraft, 8 ES-3A Shadow aircraft, and 1 C-12 aircraft. NAS Cecil Field is nearly 30,000 acres in size. It is scheduled for closure in September 1998 as a result of BRAC 1993. (Public Affairs Office for Commander, Naval Base Jacksonville, 1996)

The NAVSTA Mayport's motto is to provide "The Finest Service to the Finest Fleet." It is home to 23 ships, including the aircraft carrier USS John F. Kennedy, 75 SH-60 Seahawk anti-submarine warfare helicopters, and one C-12 aircraft. The base

encompasses more than 3,400 acres. (Public Affairs Office for Commander, Naval Base Jacksonville, 1996)

This chapter is an economic analysis to compare the costs of continuing Government ownership of these three bases' potable water distribution systems with the estimated costs if they were privatized. Currently, although the Navy owns these systems, their daily operation and maintenance is provided through a single, five-year Facilities, Maintenance, and Utilities (FMU) contract. Thus, they are considered a single entity, the Jacksonville Military Complex, in this cost comparison.

This analysis considers two scenarios. Scenario 1 is the status quo; the Government owns the potable water distribution systems and contracts out their daily operation and maintenance. Scenario 2 considers privatizing the system, selling it to the local utilities - NAS Jacksonville and NAS Cecil Field to Jacksonville Electric Authority (JEA) and NAVSTA Mayport to the City of Atlantic Beach. In order to ascertain which alternative is in the best interest of the Government, several financial calculations are performed to determine the NPV of each alternative. The alternative deemed to have the smallest NPV is the one which is in the best interest of the Government. Chapter VI will make recommendations, based upon the findings of this chapter.

A. SCENARIO 1 - STATUS QUO

This scenario considers the Government continuing to own the Jacksonville Military Complex's potable water distribution systems and contract out their daily operation and maintenance. The three main calculations needed to tabulate the NPV of

scenario 1 are the annual operations & maintenance (O&M) expenses, the annual administrative & overhead expenses, and the annual unit cost of capital for the systems.

Table 10 provides a summary of the NPV analysis for scenario 1.

Table 10. Life-Cycle Cost Report: Scenario 1-Status Quo

Fiscal Year	O&M Expenses	Admin & Overhead	Unit Cost of Capital	Total Annual Outlays	Middle of Year Discount Factors	Present Value	Cumulative NPV
	(01)	(02)	(03)	(04)	(05)	(06)	(07)
1996	\$ 1,701,575	\$ 166,153	\$ 732,785	\$ 2,600,513	0.968	\$ 2,517,297	\$ 2,517,297
1997	\$ 1,739,860	\$ 169,891	\$ 745,609	\$ 2,655,360	0.906	\$ 2,405,756	\$ 4,923,053
1998	\$ 1,778,137	\$ 173,629	\$ 758,657	\$ 2,710,423	0.848	\$ 2,298,439	\$ 7,221,491
1999	\$ 1,509,231	\$ 147,371	\$ 771,933	\$ 2,428,535	0.794	\$ 1,928,257	\$ 9,149,748
2000	\$ 1,542,434	\$ 150,613	\$ 785,442	\$ 2,478,489	0.744	\$ 1,843,996	\$ 10,993,744
2001	\$ 1,576,368	\$ 153,927	\$ 799,187	\$ 2,529,482	0.696	\$ 1,760,519	\$ 12,754,264
2002	\$ 1,611,048	\$ 157,313	\$ 813,173	\$ 2,581,534	0.652	\$ 1,683,160	\$ 14,437,424
2003	\$ 1,646,491	\$ 160,774	\$ 827,404	\$ 2,634,669	0.611	\$ 1,609,783	\$ 16,047,206
2004	\$ 1,682,714	\$ 164,311	\$ 841,883	\$ 2,688,908	0.572	\$ 1,538,055	\$ 17,585,262
2005	\$ 1,719,734	\$ 167,926	\$ 856,616	\$ 2,744,276	0.535	\$ 1,468,188	\$ 19,053,449
2006	\$ 1,757,568	\$ 171,620	\$ 871,607	\$ 2,800,795	0.501	\$ 1,403,198	\$ 20,456,648
2007	\$ 1,796,234	\$ 175,396	\$ 886,860	\$ 2,858,490	0.469	\$ 1,340,632	\$ 21,797,280
2008	\$ 1,835,751	\$ 179,255	\$ 902,380	\$ 2,917,386	0.439	\$ 1,280,732	\$ 23,078,012
2009	\$ 1,876,138	\$ 183,198	\$ 918,172	\$ 2,977,508	0.411	\$ 1,223,756	\$ 24,301,768
2010	\$ 1,917,413	\$ 187,229	\$ 934,240	\$ 3,038,882	0.385	\$ 1,169,970	\$ 25,471,737
2011	\$ 1,959,596	\$ 191,348	\$ 950,589	\$ 3,101,533	0.361	\$ 1,119,653	\$ 26,591,391
2012	\$ 2,002,707	\$ 195,558	\$ 967,224	\$ 3,165,489	0.338	\$ 1,069,935	\$ 27,661,326
2013	\$ 2,046,767	\$ 199,860	\$ 984,151	\$ 3,230,778	0.316	\$ 1,020,926	\$ 28,682,252
2014	\$ 2,091,796	\$ 204,257	\$ 1,001,373	\$ 3,297,426	0.296	\$ 976,038	\$ 29,658,290
2015	\$ 2,137,815	\$ 208,750	\$ 1,018,897	\$ 3,365,462	0.277	\$ 932,233	\$ 30,590,523
2016	\$ 2,184,847	\$ 213,343	\$ 1,036,728	\$ 3,434,918	0.260	\$ 893,079	\$ 31,483,602
2017	\$ 2,232,914	\$ 218,036	\$ 1,054,871	\$ 3,505,821	0.243	\$ 851,915	\$ 32,335,516
2018	\$ 2,282,038	\$ 222,833	\$ 1,073,331	\$ 3,578,202	0.228	\$ 815,830	\$ 33,151,346
2019	\$ 2,332,243	\$ 227,736	\$ 1,092,114	\$ 3,652,093	0.213	\$ 777,896	\$ 33,929,242
2020	\$ 2,383,552	\$ 232,746	\$ 1,111,226	\$ 3,727,524	0.200	\$ 745,505	\$ 34,674,747

1. Operations & Maintenance Expense

The O&M figure located in column (01) of Table 10 was obtained from Public Works Center (PWC) Jacksonville's Fiscal Year 1996, Utilities Cost Analysis Report (UCAR). This expense is the sum of the line items Contract and Other for operations and maintenance of both water production and distribution. PWC Jacksonville expects that this expense will change only as a result of inflation (Bazemore, December 4, 1996).

As NAS Cecil Field is scheduled to close in 1998, the operations and maintenance expense located in column (01) of Table 10 has been reduced from 1999 through 2020 in proportion to NAS Cecil Field's annual water consumption, which is calculated for scenario 2. It is unlikely that this expense will actually reduce in direct proportion to the bases' 16.95 percent share of the Jacksonville Military Complex's annual water consumption, because there must be some fixed costs involved. For purposes of this thesis, however, it will be assumed that the operations and maintenance will be reduced by this amount.

2. Administrative & Overhead Expense

These figures are contained in column (02) of Table 10. They were also obtained from PWC Jacksonville's FY 1996 UCAR. This expense included the line items titled Labor and Overhead for both water production and distribution. Again, PWC Jacksonville expects that this number will only increase due to inflation (Bazemore, December 4, 1996). The same assumption will be made here as was made above for the operations and maintenance expense. A 16.95 percent reduction is calculated in the administrative and overhead expense from 1999 through 2020 due to the closure of NAS Cecil Field.

3. Unit Cost of Capital

This figure, as explained in Chapter IV, is the Government's imputed cost of capital. Thus, the value of the system is needed to determine this amount. The Current Plant Value (CPV) of the Jacksonville Military Complex's water systems was taken from NAVFAC's P-164 and then reduced by an estimate of accumulated depreciation.

Components were depreciated two percent per year since their date of acquisition, as water systems are considered to have a 50-year life. The net value of the Jacksonville Military Complex's water systems was estimated to be \$7,201,816. Table 11 provides the details of the unit cost of capital calculation. For this analysis, the annual additions are estimated to be 1.75 percent of the plant value (Bazemore, December 2, 1996). Additions are included in column (02) of Table 11. Column (03) is a sum of columns (01) and (02). This figure is then multiplied by 10 percent to arrive at the unit cost of capital, column (05). (Kilway, December 2, 1996). Although Cecil Field will be closing in 1998, the Navy will continue to own the system and be responsible for repairs to it until it is privatized. Therefore, for purposes of this analysis, it will be assumed that the Government maintains ownership of the system throughout the study period.

4. Net Present Value Calculation for Scenario 1

The purpose of Table 10 is to calculate the Net Present Value for scenario 1. Column (04) of Table 10, total annual outlays, is a sum of columns (01) - (03). This value is then multiplied by the middle of the year (MOY) discount factor at 6.8 percent, found in column (05) to arrive at the present value of the annual outlays, column (06). Finally, the cumulative NPV is calculated in column (07) by summing all of the year's present values. The result of the calculations for scenario 1 is a NPV of \$34,674,747.

B. SCENARIO 2 - PRIVATIZATION

This scenario considers privatization of the Jacksonville Military Complex's potable water distribution systems. It assumes that a local utility, JEA, will purchase the

Table 11. Unit Cost of Capital Calculation - Scenario 1

Year	Beginning	Additions	Ending	%Rate	Unit Cost of Capital
	(01)	(02)	(03)	(04)	(05)
	\$ 7,201,816	\$ -	\$ 7,201,816	10%	
1996	\$ 7,201,816	\$ 126,032	\$ 7,327,848	10%	\$ 732,785
1997	\$ 7,327,848	\$ 128,237	\$ 7,456,085	10%	\$ 745,609
1998	\$ 7,456,085	\$ 130,481	\$ 7,586,567	10%	\$ 758,657
1999	\$ 7,586,567	\$ 132,765	\$ 7,719,332	10%	\$ 771,933
2000	\$ 7,719,332	\$ 135,088	\$ 7,854,420	10%	\$ 785,442
2001	\$ 7,854,420	\$ 137,452	\$ 7,991,872	10%	\$ 799,187
2002	\$ 7,991,872	\$ 139,858	\$ 8,131,730	10%	\$ 813,173
2003	\$ 8,131,730	\$ 142,305	\$ 8,274,035	10%	\$ 827,404
2004	\$ 8,274,035	\$ 144,796	\$ 8,418,831	10%	\$ 841,883
2005	\$ 8,418,831	\$ 147,330	\$ 8,566,160	10%	\$ 856,616
2006	\$ 8,566,160	\$ 149,908	\$ 8,716,068	10%	\$ 871,607
2007	\$ 8,716,068	\$ 152,531	\$ 8,868,599	10%	\$ 886,860
2008	\$ 8,868,599	\$ 155,200	\$ 9,023,800	10%	\$ 902,380
2009	\$ 9,023,800	\$ 157,916	\$ 9,181,716	10%	\$ 918,172
2010	\$ 9,181,716	\$ 160,680	\$ 9,342,396	10%	\$ 934,240
2011	\$ 9,342,396	\$ 163,492	\$ 9,505,888	10%	\$ 950,589
2012	\$ 9,505,888	\$ 166,353	\$ 9,672,241	10%	\$ 967,224
2013	\$ 9,672,241	\$ 169,264	\$ 9,841,506	10%	\$ 984,151
2014	\$ 9,841,506	\$ 172,226	\$ 10,013,732	10%	\$ 1,001,373
2015	\$ 10,013,732	\$ 175,240	\$ 10,188,972	10%	\$ 1,018,897
2016	\$ 10,188,972	\$ 178,307	\$ 10,367,279	10%	\$ 1,036,728
2017	\$ 10,367,279	\$ 181,427	\$ 10,548,707	10%	\$ 1,054,871
2018	\$ 10,548,707	\$ 184,602	\$ 10,733,309	10%	\$ 1,073,331
2019	\$ 10,733,309	\$ 187,833	\$ 10,921,142	10%	\$ 1,092,114
2020	\$ 10,921,142	\$ 191,120	\$ 11,112,262	10%	\$ 1,111,226

NAS Jacksonville and NAS Cecil Field water systems. This scenario further assumes that another local utility, the City of Atlantic Beach, will purchase the NAVSTA Mayport system. The calculations pertinent to determine the NPV of this scenario are the annual water consumption, annual water purchases, and facilities credit. Table 12 contains these calculations.

Table 12. Life-Cycle Cost Report: Scenario 2-Privatization

Fiscal Year	Water Purchases	Facilities Credit	Total Annual Outlays	Middle of Year Discount Factors	Present Value	Cumulative NPV
	(01)	(02)	(03)	(04)	(05)	(06)
1996	\$ 1,309,448	\$ (1,172,062)	\$ 137,386	0.968	\$ 132,990	\$ 132,990
1997	\$ 1,354,827	\$ (1,172,062)	\$ 182,765	0.906	\$ 165,585	\$ 298,575
1998	\$ 1,405,794	\$ (1,172,062)	\$ 233,732	0.848	\$ 198,205	\$ 496,779
1999	\$ 1,262,257	\$ (1,172,062)	\$ 90,195	0.794	\$ 71,615	\$ 568,394
2000	\$ 1,300,783	\$ (1,172,062)	\$ 128,721	0.744	\$ 95,768	\$ 664,163
2001	\$ 1,329,400	\$ (1,172,062)	\$ 157,338	0.696	\$ 109,507	\$ 773,670
2002	\$ 1,358,647	\$ (1,172,062)	\$ 186,585	0.652	\$ 121,653	\$ 895,323
2003	\$ 1,388,537	\$ (1,172,062)	\$ 216,475	0.611	\$ 132,266	\$ 1,027,590
2004	\$ 1,419,085	\$ (1,172,062)	\$ 247,023	0.572	\$ 141,297	\$ 1,168,887
2005	\$ 1,450,305	\$ (1,172,062)	\$ 278,243	0.535	\$ 148,860	\$ 1,317,747
2006	\$ 1,482,212	\$ 0	\$ 1,482,212	0.501	\$ 742,588	\$ 2,060,335
2007	\$ 1,514,820	\$ 0	\$ 1,514,820	0.469	\$ 710,451	\$ 2,770,786
2008	\$ 1,548,146	\$ 0	\$ 1,548,146	0.439	\$ 679,636	\$ 3,450,422
2009	\$ 1,582,206	\$ 0	\$ 1,582,206	0.411	\$ 650,287	\$ 4,100,708
2010	\$ 1,617,014	\$ 0	\$ 1,617,014	0.385	\$ 622,550	\$ 4,723,259
2011	\$ 1,652,588	\$ 0	\$ 1,652,588	0.361	\$ 596,584	\$ 5,319,843
2012	\$ 1,688,945	\$ 0	\$ 1,688,945	0.338	\$ 570,863	\$ 5,890,706
2013	\$ 1,726,102	\$ 0	\$ 1,726,102	0.316	\$ 545,448	\$ 6,436,155
2014	\$ 1,764,076	\$ 0	\$ 1,764,076	0.296	\$ 522,166	\$ 6,958,321
2015	\$ 1,802,886	\$ 0	\$ 1,802,886	0.277	\$ 499,399	\$ 7,457,721
2016	\$ 1,842,550	\$ 0	\$ 1,842,550	0.260	\$ 479,063	\$ 7,936,784
2017	\$ 1,883,086	\$ 0	\$ 1,883,086	0.243	\$ 457,590	\$ 8,394,373
2018	\$ 1,924,514	\$ 0	\$ 1,924,514	0.228	\$ 438,789	\$ 8,833,163
2019	\$ 1,966,853	\$ 0	\$ 1,966,853	0.213	\$ 418,940	\$ 9,252,102
2020	\$ 2,010,124	\$ 0	\$ 2,010,124	0.200	\$ 402,025	\$ 9,654,127

1. Annual Water Consumption

The annual water consumption is the first calculation required for scenario 2, as it is needed to calculate the cost of the annual water purchases. This figure is calculated by taking the contractor's monthly reports and totaling the FY 1996 potable water consumption figures for the three bases. NAS Jacksonville reads consumption at three locations: building 127, building 640, and building 2050. NAS Cecil Field records consumption at four locations: building 16, building 361, building 609, and building 3043. NAVSTA Mayport lists consumption at only one well, building 1906. NAVSTA Mayport currently purchases water for its off-base activities, including its 400 housing units, the Commissary and Navy Exchange Facilities, and the Child Development Center

from the City of Atlantic Beach. As these purchase levels will not change from scenario 1 to 2, they are not included in this analysis. Table 13 provides a summary of each location's meter size and its consumption level.

Table 13. Summary of the Jacksonville Military Complex's FY1996 Water Consumption per Well Meter

Meter Location	Meter Size	Consumption	Percent
NAS Jax - bldg 127	20"	407,348.00	34.51
NAS Jax - bldg 640	12"	99,196.00	8.40
NAS Jax - bldg 2050	12"	31,047.90	2.63
NAVSTA Mypt - bldg 1906	n/a	442,650.00	37.50
NAS Cecil - bldg 16	12"	84,355,520.00	7.15
NAS Cecil - bldg 361	12"	73,270.15	6.21
NAS Cecil - bldg 609	12"	8,129.50	0.69
NAS Cecil - bldg 3043	8"	34,273.85	2.91

Once the FY 1996 consumption is calculated, estimates are made regarding water consumption in the out-years of the life-cycle-analysis. These numbers are provided by the Installation Water Resources Analysis and Planning System (IWRAPS) which Planning and Management Consultants, Limited., developed while under contract with the Naval Facilities Engineering Service Center.

The IWRAPS program uses typical weather data and planned future construction and demolition to project the future water usage. Its annual potable water consumption is a direct function of the Base's square footage. As the bases only have plans for

construction and demolition for the next 10 years, the consumption estimates do not change from the year 2010 through the remainder of the life-cycle.

The IWRAPS estimates a 4.46 percent increase in NAS Jacksonville's water requirements from 1995 to 2000 and a 3.14 percent increase for NAVSTA Mayport during this time period. The water requirements are expected to remain constant at the 2000 level for the remainder of the life-cycle analysis.

As stated previously, NAS Cecil Field will be closing in 1998. Its current annual water consumption is 16.95 percent of the Jacksonville Military Complex's annual water consumption. Therefore, the annual water consumption for this analysis, is reduced by 16.95 percent from 1999 through 2020.

2. Annual Water Purchases

After the water consumption was calculated for the duration of the study, the cost to purchase this amount of water may be tabulated. These calculations assume that JEA will purchase the NAS Jacksonville and NAS Cecil Field potable water distribution systems and that the City of Atlantic Beach will purchase the Mayport system. The costs will have to be recalculated if the privatization transfers ownership of the systems to other companies.

The annual water purchases, column (01) in Table 12, is calculated for each base separately and then added together. For this calculation, NAS Jacksonville and NAS Cecil Field will be charged based upon the meter size at each well, in accordance with Table 14, JEA water rates. The meter size of these wells was provided in Table 13. NAVSTA Mayport will be charged a flat fee based on consumption, as the City of

Atlantic Beach's charter does not currently permit it to charge customers based upon their meter size. The City of Atlantic Beach charges the Navy a flat fee of \$6.35 per unit (i.e. the Commissary and Exchange are each a unit) which entitles the Navy to three kgal of water that month. Thereafter, each kgal of water is charged at \$1.70. This value for water purchases is the best that can be calculated. However, if meters were placed at individual buildings throughout the bases, consumption at each site would permit calculation of a more accurate water purchase cost. Private utilities typically do not permit master metering for the base, but require these additional meters be placed at individual buildings being serviced.

Table 14. JEA Water Rates

Meter Size	Monthly Charge	Usage Charge (748 gal)
5/8"	\$ 8.45	\$ 0.63
3/4"	\$ 10.65	\$ 0.63
1"	\$ 15.20	\$ 0.63
1 1/2"	\$ 26.35	\$ 0.63
2"	\$ 39.70	\$ 0.63
3"	\$ 75.35	\$ 0.63
4"	\$ 115.35	\$ 0.63
6"	\$ 226.85	\$ 0.63
8"	\$ 360.35	\$ 0.63
10"	\$ 516.25	\$ 0.47
12"	\$ 961.60	\$ 0.47
20"	\$ 2,009.30	\$ 0.47

3. Facilities Credit Calculation

This figure is the annual portion of the estimated fair-market value which will be repaid over the ten-year Government contract period, as discussed in Chapter IV, by a potential buyer of the utility system. As this researcher is not able to solicit bids from utilities, the fair-market value is not available. Thus, the Government's CPV for the Jacksonville Military Complex's potable water distribution systems was obtained from NAVFAC's P-164 and adjusted for accumulated depreciation. This value is the net current cost and is used here to represent the fair-market value at which the Government would transfer the facilities to private ownership. Details of this calculation are located in the appendix. A summary of this value is found in Table 15. The result of this facilities credit, based upon the adjusted CPV found in Table 15, the ten-year annual facilities credit at a 10 percent interest rate was calculated to be \$1,172,062.

Table 15. Summary of CPV for Jacksonville Military Complex's Potable Water Distribution Systems

	NAS Jacksonville	NAVSTA Mayport	NAS Cecil Field	Total
CPV from P-164	\$28,869,000	\$25,746,740	\$22,362,000	\$76,977,740
Accumulated Depreciation	\$28,583,240	\$19,882,744	\$21,309,940	\$69,775,924
Net Current Costs	\$285,760	\$ 1,052,060	\$ 5,863,996	\$ 7,201,816

4. Net Present Value Calculation for Scenario 2

The NPV calculation is made as follows. Column (03) of Table 12, the scenario 2 Life-Cycle Report, is total annual outlays. It is the sum of columns (01) and (02) of Table

12. This value is then multiplied by the middle of the year (MOY) discount factor at 6.8 percent, found in column (04) of Table 12 to arrive at the present value of the total annual outlays, column (05). Finally, the cumulative NPV is calculated in column (06) of Table 12 by summing all of the year's present values. The NPV for scenario 2 is calculated to be \$9,654,127. Table 16 summarizes the results of this analysis.

Table 16. Summary of Jacksonville Military Complex's Potable Water Distribution System Life-Cycle Cost Analysis

Scenario	Net Present Value
1. Status Quo	\$ 34,674,747
2. Privatization for CPV	\$ 9,654,127

VI. CONCLUSIONS AND RECOMMENDATIONS

This chapter makes statements of conclusion to the thesis primary and subsidiary questions. These statements of conclusion are based upon the researchers literature review, interviews conducted, and data gathered and analyzed. This chapter also provides recommendations and areas for further research.

A. CONCLUSIONS

1. Primary Research Question. Is It Economically Beneficial for DoD To Privatize the Potable Water Distribution Systems of the Jacksonville Military Complex?

A comparison of the NPVs calculated for scenarios 1 and 2 indicate that it is economically beneficial for DoD to privatize the potable water distribution systems of the Jacksonville Military Complex. The NPV for scenario 1 was found to be \$34,674,747, while the NPV of scenario 2 was found to be \$9,654,127, for the sales price of \$7,201,816. Although the Complex will incur the additional cost of water purchases if privatization occurs, it will eliminate the current operations and maintenance, administrative and overhead, and unit cost of capital expenses and will earn a facilities credit.

2. Subsidiary Question # 1. What are the Circumstances in the Public Sector That Give Rise to Privatization?

Chapter II lists the circumstances in the public sector that give rise to privatization. Chapters III and IV mention the various Congressional requirements to

achieve privatization and show that politics, not merely economics drive the public sector. Government makes some decisions that produce inefficient operating results in order to fulfill its mission of serving the people. With the decrease of the Federal Discretionary Budget and the emergence of a single world economy, privatization is gaining new interest and momentum. The Army has stated that its goal is to privatize 75 percent of its utility systems by the year 2000 (Eng, 1996, p. 4), as mentioned in Chapter III.

3. Subsidiary Question #2. What are the Major Impediments to Privatization?

The major impediments to privatization, as discussed in Chapter III, were found to be implementation concerns and Congressional legislation. A specific implementation concern is the fact that there is no single model of how to achieve a successful privatization. The six techniques that Britain used to privatize numerous assets were discussed to provide suggestions for successful privatization in the United States. Chapter III also discussed the need for an interested party and concern over legal liability and lack of control which surface when a service is considered for privatization.

4. Subsidiary Question #3. What Role Does Congress Play in Privatization?

Congress's role in privatization was bundled in three legislative issues in Chapter III: the CIAC tax, authorization level for privatization, and the fair-market value determination. As mentioned, this tax was waived for transfers for water or sewage disposal services, but not for gas and electric systems. Legislation to correct this oversight is not expected to be signed until fiscal year 1999.

The Military Services interpret the current utility systems privatization laws differently, as discussed in Chapter III. They have drafted legislative proposals to delegate transfer authority for privatization to the level of the Secretary of the Military Department. This legislation is expected to be reviewed by Congress in fiscal year 1997 and would shorten the approval process by approximately two years.

The third Congressional involvement in privatization mentioned in Chapter III is the requirement to obtain at least fair-market value for the transfer of property. Again, the Services are drafting language to submit to Congress which would permit the recouping of the fair-market value of a utility system in any form, including facilities credits mentioned in Chapters IV and V, which is beneficial to the Government.

5. Subsidiary Question #4. What are the Costs/Benefits of Privatizing the Potable Water Distribution Systems for NAVWEPSTA Earle?

As discussed in Chapter IV, the Guernsey study found that privatization at either the \$1.1 million bid price of NJAWC or the \$2 million fair-market value, determined by Guernsey, was in the best interest of the Government. The NPV of the potable water distribution system was calculated to be 44.6 percent less for the \$2 million privatization sales price than for the status quo, maintaining Government ownership and operation. The \$1.1 million privatization sales price was calculated to be 36.1 percent less than the status quo. C. H. Guernsey concluded that "privatization actions will provide a cost-effective means for continued safe and reliable potable water distribution service to the Station ...NAVWEPSTA Earle should enter into negotiations with NJAWC to secure a

facilities acquisition and service arrangement (C. H. Guernsey & Company, August 1995, p. 4-8)."

6. Subsidiary Question #5. How Do the Costs of Outsourcing the Potable Water Distribution Systems for the Jacksonville Military Complex Compare To the Costs of Privatization?

The Jacksonville Military Complex currently outsources its potable water distribution systems. Chapter V looked at the current operations as scenario 1 and compared them to the costs to privatize the system at a sales price of the CPV, adjusted for depreciation, \$7,201,816, scenario 2. Calculations performed in Chapter V indicate that a 72 percent savings would be realized if these systems were privatized for this tabulated CPV. This tabulated figure is not necessarily representative of the value a private utility company would be willing to pay for the system. Thus, NPV for scenario 2 may be understated.

B. RECOMMENDATIONS

1. Solicit Bids From Utilities to Determine the System's Fair Value

Bids should be solicited from utilities concerning the amount they would be willing to pay to purchase the potable water distribution systems of the Jacksonville Military Complex. Once bids are received, their NPVs should be determined and compared with the NPV of the status quo scenario. The scenario with the smaller NPV, which is technically capable of providing the service, should be selected.

2. Develop a New System to Record Plant Value

The P-164 which NAVFAC uses to list the current plant value (CPV) of its systems is difficult to read. Components are listed by the Public Works Center (PWC) which services them, however, all components located on one base are not necessarily listed together. The reader has to pick through the entire entries for the PWC to be able to list components for a base. Also, the P-164 is not updated frequently by the various PWCs to reflect the repairs and improvements made nor is depreciation taken into account. Therefore, the data in the P-164 is not an accurate account of the value of components. A new system which takes depreciation into account and makes it easier for field activities to update data is needed and will provide better records.

3. Install Water Meters at Major Customer's Buildings

Currently, the potable water requirements for the Jacksonville Military Complex are not known. Water consumption is monitored at three wells on NAS Jacksonville, four wells on NAS Cecil Field, and one well on NAVSTA Mayport. How much water is actually distributed to each customer is not known. Customers are charged for water based upon estimates of usage performed in the past. These estimates were derived by taking the size of the building, number of employees, and function of the command into account. Private utilities tend to charge for water based upon individual meters installed at buildings, not master meters. Therefore, to calculate a more realistic price for water purchases, if the systems were privatized, consumption at each building would have to be known.

C. AREA FOR FURTHER RESEARCH

In order to determine the current value of the Jacksonville Military Complex's potable water distribution systems, a physical inventory of the systems would be required to determine their current condition. This would entail performing an inventory of the pipelines, storage tanks, pumps, etc. and determination of replacement cost, based upon the age of the system components.

APPENDIX

Naval Air Station Jacksonville				
Water System	Years Since	CPV	Accumulated	Net Current
Component	Acquisition	from P-164	Depreciation	Costs
Wtr Tmt Fac	>50	\$ 2,646,000	\$ 2,646,000	\$ -
Wtr Trmnt facil	>50	\$ 727,000	\$ 727,000	\$ -
Bldg	20	\$ 139,000	\$ 55,600	\$ 83,400
Stor Tnk/EI-Pot	>50	\$ 1,055,000	\$ 1,055,000	\$ -
Stor Tnk/Gd-Pot	>50	\$ 689,000	\$ 689,000	\$ -
Well/Rsrvr-pot	>50	\$ 382,000	\$ 382,000	\$ -
Util	15	\$ 16,000	\$ 4,800	\$ 11,200
Util	16	\$ 93,000	\$ 29,760	\$ 63,240
Wtr Dist Bldg	>50	\$ 26,000	\$ 26,000	\$ -
Wtr/Dist/Ln/Pot	>50	\$ 22,540,000	\$ 22,540,000	\$ -
Tank Fire Prot	>50	\$ 309,000	\$ 309,000	\$ -
Wtr Sply/Str Np	39	\$ 164,000	\$ 36,080	\$ 127,920
Wtr-Sup/Tmt/Stg	>50	\$ 83,000	\$ 83,000	\$ -
Sub-total		\$ 28,869,000	\$ 28,583,240	\$ 285,760

Naval Station Mayport				
Water System	Years Since	CPV	Accumulated	Net Current
Component	Acquisition	from P-164	Depreciation	Costs
New plant	3	\$ 4,342,740	\$ 260,564	\$ 4,082,176
Water Dist - Pot	5	\$ 71,000	\$ 7,100	\$ 63,900
Wtr Tmt Fac	34	\$ 518,000	\$ 352,240	\$ 165,760
Well/Rsrvr Pot	34	\$ 46,000	\$ 31,280	\$ 14,720
Wtr/Dist/Ln/Pot	>50	\$ 17,647,000	\$ 17,647,000	\$ -
Util	33	\$ 1,115,000	\$ 735,900	\$ 379,100
Water-Fire Pro	13	\$ 801,000	\$ 208,260	\$ 592,740
Wtr Sply/Str NP	34	\$ 21,000	\$ 14,280	\$ 6,720
Water Dist-Pot	18	\$ 278,000	\$ 100,080	\$ 177,920
Stor Tank/EI Pot	34	\$ 423,000	\$ 287,640	\$ 135,360
Stor Tank/Gd Pot	34	\$ 232,000	\$ 157,760	\$ 74,240
Well/Rsrvr Pot	16	\$ 252,000	\$ 80,640	\$ 171,360
Sub-total		\$ 25,746,740	\$ 19,882,744	\$ 5,863,996

Naval Air Station Cecil Field				
Water System Component	Years Since Acquisition	CPV from P-164	Accumulated Depreciation	Net Current Costs
Wtr-Sup/Tmt/Stg	37	\$ 4,000	\$ 2,960	\$ 1,040
Water Dist-Pot	18	\$ 4,000	\$ 1,440	\$ 2,560
Wtr Tmt Fac Bld	37	\$ 314,000	\$ 232,360	\$ 81,640
Wtr Trmnt Facil	19	\$ 175,000	\$ 66,500	\$ 108,500
Stor Tnk/EI Pot	37	\$ 173,000	\$ 128,020	\$ 44,980
Stor Tnk/Gd Pot	19	\$ 170,000	\$ 64,600	\$ 105,400
Wtr/Dist/Ln/Pot	37	\$ 997,000	\$ 737,780	\$ 259,220
Util	19	\$ 135,000	\$ 51,300	\$ 83,700
Wtr Tmt Fac Bld	>50	\$ 80,000	\$ 80,000	\$ -
Bldg	40	\$ 3,000	\$ 2,400	\$ 600
Bldg	19	\$ 4,000	\$ 1,520	\$ 2,480
Bldg	42	\$ 3,000	\$ 2,520	\$ 480
Bldg	39	\$ 35,000	\$ 27,300	\$ 7,700
Bldg	16	\$ 4,000	\$ 1,280	\$ 2,720
Bldg	24	\$ 2,000	\$ 960	\$ 1,040
Stor Tnk/EI Pot	>50	\$ 810,000	\$ 810,000	\$ -
Strc	43	\$ 215,000	\$ 184,900	\$ 30,100
Stor Tnk/Gd Pot	>50	\$ 207,000	\$ 207,000	\$ -
Strc	39	\$ 297,000	\$ 231,660	\$ 65,340
Strc	19	\$ 151,000	\$ 57,380	\$ 93,620
Bldg	39	\$ 158,000	\$ 123,240	\$ 34,760
Wtr Dist Bldg	42	\$ 50,000	\$ 42,000	\$ 8,000
Wtr/Dist/Ln/Pot	>50	\$ 18,015,000	\$ 18,015,000	\$ -
Water-Fire Pro	33	\$ 125,000	\$ 107,500	\$ 17,500
Well/Rsrvr Pot	39	\$ 4,000	\$ 3,120	\$ 880
Util	28	\$ 11,000	\$ 6,160	\$ 4,840
Mains Pmp/Fac	36	\$ 60,000	\$ 43,200	\$ 16,800
Stor Tnk/Gd Pot	28	\$ 11,000	\$ 6,160	\$ 4,840
Well/Rsrvr Pot	28	\$ 43,000	\$ 24,080	\$ 18,920
Util	39	\$ 26,000	\$ 5,720	\$ 20,280
Water-Fire Pro	28	\$ 61,000	\$ 34,160	\$ 26,840
Wtr-Sup/Tmt/Stg	35	\$ 3,000	\$ 2,100	\$ 900
Water Dist - Pot	33	\$ 2,000	\$ 1,320	\$ 680
Wtr/Dist/Ln/Pot	8	\$ 5,000	\$ 800	\$ 4,200
Water Dist - Pot	33	\$ 5,000	\$ 3,500	\$ 1,500
Sub-total		\$ 22,362,000	\$ 21,309,940	\$ 1,052,060

LIST OF REFERENCES

Anthony, Robert N. and Young, David W. Management Control in Nonprofit Organizations. Homewood, IL: Irwin, 1988.

Ashley, Joseph, Program Manager for Navy Utility Privatization, Telephone Interview by researcher - November 22, 1996; December 12, 1996.

Bazemore, Bill. Comptroller, Public Works Center Jacksonville, Telephone Interview by researcher - December 2, 1996; December 4, 1996.

Blumenthal, Michael W., "Candid Reflections of a Businessman in Washington." *Fortune*, Jan. 29, 1979.

Brasse, Bill et. al. "Privatization Efforts -- Past, Present and Future," US Army Corps of Engineers Research Paper CP-18, Group Project. 1 May 1996.

Bryan, W. L., Director, Government and Institution Accounts, Southern California Edison, "Pre-meeting of the Privatization Issues Subgroup for the DoD/EEI Utility Partnership Dialogue," May 8, 1996.

C. H. Guernsey & Company. Privatization Study: Naval Weapons Station Earle, Colts Neck, New Jersey. Oklahoma City: August 1995.

Cole, Nancy S. and Charles P. The Post-Award Costs of Contracting Out: The U.S. Navy's Implementation of OMB Circular A-76, Master's Thesis, Naval Postgraduate School, Monterey, CA, June 1988.

Congress of the United States: Congressional Budget Office. The Economic and Budget Outlook: Fiscal Years 1997-2006. U.S. Government Printing Office: May 1996.

Department of Defense Facility Programs Legislative Proposal: Conveyance of Utility Systems. Undated.

Eng, William F., "Utilities Privatization Update," Public Works Digest: Volume VIII, No. 1 January/February 1996.

Federal Acquisition Regulation, Federal Acquisition Circulars 90-18. April 1, 1984.

Fisher, Ronald C. State and Local Public Finance. Chicago: Irwin, 1996.

Fitzgerald, Randall. When Government Goes Private: Successful Alternatives to Public Services. New York: Universe Books, 1988.

GAO/GGD-92-11, "Government Contractors: Are Service Contractors Performing Inherently Governmental Functions?" November 18, 1991.

Goodman, John C. Privatization. The National Center for Policy Analysis. Dallas: 1985.

Gore, Al, From Red Tape to Results: Creating a Government that Works Better & Costs Less. Report of the National Performance Review. U.S. Government Printing Office: September 10, 1993.

Hobie, Jeff. C. H. Guernsey & Company. Telephone Interview by researcher - December 3, 1996.

Johnson, David B. Public Choice: An Introduction to the New Political Economy. Mountain View, CA: Mayfield Publishing Company, 1991.

Kilway, Ray. Senior Project Engineer, C. H. Guernsey & Company. Telephone Interview by researcher - November 25, 1996; December 2, 1996.

Levine, Charles H., Peters, B. Guy and Thompson, Frank J. "Political Context and the Morphology of the Public Sector" in Public Administration: Challenges, Choices, Consequences. Glenview, IL: Scott, Foresman and Company, 1990.

Linowes, David F. Privatization Toward More Effective Government: Report of the President's Commission on Privatization. March 1988.

McCulla, Kevin, U.S. Army Center for Public Works, Fort Belvoir, Virginia. Telephone Interview by researcher - November 4, 1996; November 22, 1996; November 27, 1996.

Nutt, Paul C. and Backoff, Robert W. "Why Strategic Management is Different in Public and Third Sector Organizations" in Strategic Management of Public and Third Sector Organizations: A Handbook for Leaders. San Francisco: Jossey-Bass Publishers, 1992: 22-54.

Pirie, Madsen. Dismantling the State. The National Center for Policy Analysis. Dallas: 1985.

Public Affairs Office for Commander, Naval Base Jacksonville, 1996.

Savas, E.S. How to Shrink Government: Privatizing the Public Sector. Chatham, NJ: Chatham House Publishers, Inc., 1982.

Savas, E.S. Privatization: The Key to Better Government. Chatham, NJ: Chatham House Publishers, Inc., 1987.

Statement of Work Public Works Center Jacksonville, Florida: Cost of Service Study and Economic Analysis, June 11, 1996.

Stiglitz, Joseph E. Economics of the Public Sector. New York: W. W. Norton & Company, 1988.

Stroup, Richard L. Academic American Encyclopedia. Danbury, CT: Grolier Incorporated, 1994.

Title 40 United States Code Section 484. Washington: United States Government Printing Office, 1995.

Title 41 Code of Federal Regulations Chapter 101, Part 47, Subpart 305-1. Washington: United States Government Printing Office, 1995.

Thumma, John, Utilities Management Brance, Atlantic Division, Naval Facilities Engineering Command. Norfolk, Virginia. Telephone Interview by researcher - November 22, 1996.

Vinger, Captain Jeff, "Headquarters United States Air Force: Outsourcing and Privatization Division *Fact Sheet*, Undated.

Vinger, Captain Jeff, Air Force Program Manager for Outsourcing and Utilities Privatization, Washington, DC. Telephone Interview by researcher - November 22, 1996.

Whitta, Jim. *Department of Defense: Installations Corporate Information Management Home Page*, June 8, 1996.

INITIAL DISTRIBUTION LIST

	No. Copies
1. Defense Technical Information Center 8725 John J. Kingman Rd., STE 0944 Ft. Belvoir, VA 22060-6218	2
2. Dudley Knox Library Naval Postgraduate School 411 Dyer Rd. Monterey, CA 93943-5101	2
3. Prof. James Fremgen (Code SM/Fm) Naval Postgraduate School Monterey, CA 93943-5103	1
4. Senior Lecturer Janice Menker (Code SM/Mj) Naval Postgraduate School Monterey, CA 93943-5103	1
5. LT Debbie Cox PSC 477, Box 15 FPO, AP 96306-1215	4
6. Public Works Center Jacksonville Code 310.9 (attn: Bill Howe) Box 30, NAS Jacksonville Jacksonville, FL 32212-0030	1
7. Commander LANT NAVFACENGCOM attn: Code 164.D 1510 Gilbert Street Norfolk, VA 23511-2699	1
8. US Army Center for Public Works attn: CECPW-C (Kevin McCulla) 7701 Telegraph Road Alexandria, VA 22315-3862	1

9. Naval Facilities Engineering Command attn: Code 133 (Joe Ashley) 200 Stovall Street Alexandria, VA 22332-2300	1
10. HQ USAF/CEIO attn: Captain Jeff Vinger 1260 AF Pentagon Washington, DC 2330-1260	1
11. Ryan Kivett (SMC 1904) Naval Postgraduate School Monterey, CA 939943-5103	1